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Europe Report

SCIENCE AND TECHNOLOGY

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EUROPE REPORT

SCIENCE AND TECHNOLOGY

WEST EUROPE

/9987

BRIEFS

KRUPP SPACELAB MICROGRAVITY EXPERIMENTS--Frankfurt--In the production of turbine blades, it is possible that the incorporation of particles into the crystal lattice could considerably increase the output of the blades. Such single-crystal blades could hold up under the highest conceivable temperatures during use, and thus achieve the greatest amount of economic feasibility. However, during the stage of crystal growth from molten metal, the mixture has a tendency to force out the particles that are to be incorporated. An important role in this is played by the point of solidification, which to a certain extent pushes the particles ahead as it moves. In the Krupp Research Institute in Essen, model illustrations were developed for this process; however, they cannot be tested on earth, since gravity causes separation. In an experiment involving the incorporation of aluminum and molybdenum particles into a single copper crystal under microgravity within the framework of the German Spacelab mission D1, Krupp succeeded last fall in proving that the model illustrations were accurate, Professor Dr-Eng Juergen Poetschke of the Essen research institute reports. According to this experiment, a relatively uniform incorporation of particles is possible with a correspondingly high solidification rate. In this way, the scientific foundations have apparently been created for the development of materials with improved mechanical characteristics. In later experiments under zero-gravity, Krupp will reportedly work on the production of a special magnetic material made of manganese and bismuth, as well as the production of tough hard metal alloys made of tungsten carbide and cobalt. [Text] [Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German 22 Jul 86 p 7] 12271

CSO: 3698/595

ESA DEVELOPS POLICIES, PROGRAMS FOR 21ST CENTURY

Rome SCIENZA DUEMILA in Italian No 7, Jul 86 pp 12-19

[Excerpts] During the meeting of the Board of the European Space Agency [ESA] held in Rome on 30-31 January 1984 for the purpose of top-level political discussion of the programs and problems of ESA, two aspects of fundamental importance emerged: first, the acceptance on the part of the Americans of the fact that Europe has become a competitor of the United States in terms of independent aerospace capabilities and, second, the fact that, with the development of the ELDO program for the production of the Ariane, ESA showed that it was in a position to win for itself a healthy slice of the industrial market and international strategic market by offering guarantees of an alternative to the American shuttle system in the form of a launcher of its own at a relatively low cost.

The representatives of the member nations were also in agreement in the identification of four fundamental strategies to be pursued by the ESA in the coming decade. The first of these concerns the opening up of space to the acquisition of scientific experiments involving a medium-low financial commitment which is more in line with the activity of universities and research institutes. The aim of this is to attract both teachers and students to an entirely new sphere of exciting experimental activity.

The second strategy involves the development of telecommunications systems via satellite (OTS) using the ECS and MARECS systems, with the MARECS system being used for assistance to shipping. Meteorological observations using the METEOSAT satellites should also be capable of a rapid increase in use, including the possible upgrading of the satellite so that it can be considered a "second generation" structure. At the same time, the ESA directors felt that it was important not to disregard development of either the ERS-1 program or the POPSAT program. The former is a program for development of an orbiting probe which will be used for the study and monitoring of land resources and ecological parameters, while the POPSAT program involves development of a specially equipped satellite for highly detailed geodetic monitoring of areas prone to earthquakes which are frequently subject to progressive changes in the earth's crust.

The third objective presented by ESA to the board in Rome concerned, naturally, the technological commitment necessary to create a fully tested series of launching craft, the Ariane series. Despite the fluctuating fortunes of these launchers in recent times, they can now be regarded as having established a firm position for themselves both in terms of reliability and from a financial point of view. This is particularly true when one considers the latest test flight of the Challenger, which was a disaster, not to mention the equally negative events which have occurred in testing of the American Titan and Delta launchers. In the relevant areas of competence, the Ariane 4 and Ariane 5 should represent the spearhead of the ESA'S operational policy at least until the end of the next decade.

Finally, the ESA intends to implement its fourth basic strategy through the construction of orbiting infrastructures which will generally be placed in orbits within a distance of 500 kilometers from the earth. Under this plan, research laboratories equipped for the most diverse areas of industrial and scientific activity should find, in the vacuum of space and conditions of weightlessness, the ideal setting and conditions for testing revolutionary procedures and methods with which it has never been possible to experiment on earth. Unfortunately, there is one problem: The U.S. shuttle program, which was to give a repeat performance of the placing in orbit of SPACELAB, or the launching of the future COLUMBUS station composed of pressurized modules, or of the EURECA carrier (a carrier of totally European design) is, for the moment, immersed in the profound state of crisis following January's disaster. EURECA, for example, should be ready by June 1988. But, at the present time, who can predict which launcher will place the EURECA in space and whether, indeed, such a launcher will be ready by that date?

Probes To Suit All Tastes

Let us now try to examine in detail the program which, on the basis of the agreed operational plan, ESA is planning to conclude between the end of the 1980's and the early 1990's. Since the beginning of the present decade, the European Community has had at its disposal five scientific satellites with considerable capabilities. These are the COS-B (monitoring of gamma radiation sources in space); the ISEE-2 (physics of interaction between the sun and the earth); the GEOS-2 (a geodetic satellite for studying crops, resources and the environment); the IUE (monitoring of UV radiation sources in space) and, finally, the EXOSAT astronomic observatory for monitoring in the X-ray band, which has been operational since 1983. In addition to these five satellites, four new highly sophisticated missions have been embarked upon, including the GIOTTO mission, which has just been used for the first flyby close to the nucleus of a comet.

Future programs will be characterized by the application of satellites to an initial observatory which will be used for astrometric observations. This observatory will be given the name of HIPPARCOS, and its function will be to provide a complete catalog of the positions of something in the range of 100,000 stars. A second observatory will then be placed in orbit. This observatory, known as the ISO, will be fully equipped for studying sources in space in the infrared band, particularly those sources hidden in the central regions of the galaxy. In the ISO, the difficult problems regarding instrumentation inherent in this type of observation (e.g. the problem of stabilizing the low temperatures at which these instruments have to operate) will, for the first time, be dealt with in a rational solution which will meet the high constraints imposed by the technologies of launching and space stabilization. However, it is unlikely that the ISO will become operational before the early 1990's.

The most ambitious programs and aspirations include the ISPM mission, created for studying the polar regions of the sun and of interplanetary spaces far from the ecliptical plane. One of the reasons why the ISPM is important is the fact that this is a highly sophisticated project and one which, despite the difficulties and problems encountered in its early stages, is now bringing out the very best in the close relationship of collaboration between the European and American aerospace experts involved.

Unfortunately, this is another project on which the Challenger tragedy has left a deep imprint. The reason for this is that, apart from an independent propulsion stage of the CENTAUR class, the primary vehicle which would launch the Ulysses (the official name of the ISPM mission) into space was to have been a shuttle.

Telecommunication and Transport

Within the framework of the upgrading of the MARECS system which provides maritime telecommunications via satellite, the ESA is also increasing the role it plays in the international telephone and telex network. The aim of this is to reduce the isolation of ships at sea. The operational program that the ESA intends to complete is known as MARECS-B2. This program, together with the MARECS-A program implemented in 1981, is controlled by INMARSAT, the international organization for assistance to shipping.

In recent years, ESA has already developed satellites which respond to the demands of the business sector regarding telephone, radio, and television services. The program presently being implemented by ESA -- the ECS program -- concerns the implementation of five operational satellite stations for telecommu-

nications, and will be completed with the forthcoming flights of the Ariane launcher which are scheduled for this year and next year. The ECS program also is to be coordinated by a special European organization known as EUTELSAT.

In addition, 1987 is the year in which the activity of a new telecommunications satellite of the latest design, which will offer a broad range of possibilities, is scheduled to begin. This new satellite, known as OLYMPUS, will be capable of guaranteeing multichannel links for European commercial television networks. As regards Italy, perhaps we should just mention that RAI-TV has already reached an agreement for permanent use of a couple of these channels. The OLYMPUS will also operate from an orbiting base in order to carry out experiments in telecommunications using millimetric waves.

Naturally, the development of programs for the upgrading of a whole range of services -- scientific services, commercial and information services -- using satellites presupposes similar developments in the efficiency and cost-effectiveness of the launchers for these satellites. In order to be able to send increasingly complex and heavy stations into geostationary orbit at a distance of 36,000 kilometers from the earth's surface, it has been necessary to study and develop versions of the well known European launcher of the Ariane class which are more suited to this function. The existing versions, Ariane-2 and Ariane-3, represent a fairly satisfactory response to the ordinary requirements of the user nations. But, in view of the fact that it will soon become necessary to launch into low orbits as well as into synchronous orbits loads of between 4 and 15 tons with dimensions as great as 450 cm., it is becoming more and more important to speed up completion of the Ariane 4. Moreover, work must also start on development of the more powerful version of this launcher, the Ariane 5; just recently, in fact, it was decided to adopt a special propulsion system for this launcher which, for those not directly involved in the work, is presently known only by its identification code of HM60. The Ariane 5 is scheduled to enter into operation within the next 10 years and at that point, it is hoped, it will take its place on the international markets as a full-fledged competitor of two new types of launchers which today are still in the study phase, one in Japan and the other in the United States. In the meantime, the Ariane 4 will have come into service (something which should, in fact, happen before the end of this year). Moreover, the launching of 19 launchers of this class will mean that the impressive task of placing no fewer than 25 satellites in orbit between today and the end of 1987 will be accomplished.

Infrastructures in Orbit

"Infrastructures in orbit"--a somewhat enigmatic term behind which lie concealed the dreams and ideals of generations of astronautics experts: the construction in space of functional modules which can be interconnected as necessary to create a larger orbiting station which could be inhabited permanently by a team of astronauts with operational roles and responsibilities.

And, in fact, the role that a space station of this kind would play in scientific and economic terms is impossible to assess. The behavior of numerous biological processes, and the behavior of the most diverse industrial, chemical, and physical methods when subject to long periods in an environment without gravity--all these are aspects whose surface was barely scraped by the experience gained by SPACELAB-1 in December 1983. Nevertheless, such processes have had time to bring to the attention of experts and researchers unhoped for areas of research, research which ranges from the effects of the bombardment by energy originating in the sun on the metobolism of bacteria and viruses, to the growth of crystals, to the formation of metal alloys under weightless conditions, to biological disturbances of the sense of balance and orientation in human beings.

And there is still another important consideration that we must not overlook; namely that any future manned orbiting station will have to "last" for periods of time immeasurably longer than those required for today's automatic satellites. And this "lifespan" has to be achieved despite the severe erosive action and immense powers of filtration of solid particles blown by the solar wind and of high-energy photons and penetrating cosmic radiation. Moreover, a base of this kind will have to provide absolute guarantees that the internal ecological balance remains unaltered, providing total protection of that internal area from all damaging interaction with the exterior.

If all this is to be accomplished, one can understand that it is absolutely vital that intense studies be carried out on the properties of a vast range of materials, both inert and biological, as well as of the utilization of these materials in environmental conditions which are so vastly different from conditions on earth.

In this respect, fluid thermodynamics, solid-state electronics, microbiology and genetic engineering can be seen to be extremely promising areas of research, since it appears certain that survival and comfort onboard a vast space station will be guaranteed by a perfect process of heat exchange with the exterior, by the functional nature of the station's electronic control and communications systems, and by the total independence of the most diverse biochemical processes (enzyme fermentation, action of chlorophyl, maintenance of the physical parameters of physiological liquids, and so forth) in an environment characterized by the absence of gravity and by a different spectrum of electromagnetic radiation from the sun.

Avant-garde Technology

In its long term plan presented to the meeting in Rome, the ESA estimated that a minimum of 100 experimental runs will have to be completed before the venture concerning construction of a permanent base in space can finally move beyond the realm of theoretical studies and research. In this article, we will obviously restrict our survey of this work to a few of the most important aspects. We will start with the testing of a microgravity sensor which will consist of a single silicon crystal capable of producing variation in electrical capacitants as a result of minute shifts in the electric field when subjected to accelerations within the range of 10^{-27} - 10^{-3} of the normal gravity on the surface of the earth. The device in question, which will be referred to as a capacitative accelerometer, will obviously be able to operate only under conditions of weightlessness. Its function will be to supply extremely accurate measurements of the tiny variations in the external field of gravity--either natural or artificially produced--and in the presence of which many of the biological, scientific, physical and technological tests will have to be conducted.

Second, experiments have to be carried out on the effectiveness of a large, "all-European" radio antenna of totally new design. The conducting grid will be printed by means of a metallic deposit on a double-sided, flexible polyeurethane support, with the gas being introduced into the space between the two sides. When inflated, the support will assume the shape of a lens of the necessary rigidity, and the conducting grid will start functioning as a reflecting antenna for millimetric waves.

An example of a grid of this kind has already been produced. It has a diameter of 350 centimeters; the space occupied during transport is absolutely minimal and the device can be inflated in space under the heating effect of solar radiation. It is thought that this convenient solution may also be used as a basis for large-surface heat protection panels, as well as panes for photoelectric cells.

The delicate problem of controlling the effective course of a low-orbit space station will be solved with the use of a special device known as "trajectory sensor." This device will compare the Doppler change in the frequency of the radio waves reflected from the earth both in the nominal direction of flight and at right angles to it.

With reference to metallurgy under conditions of weightlessness, a device known as an "electrostatic levitator" is being developed. This consists of a furnance fueled by the sun's heat and in which the metal is protected from all contact and (and contamination from) the walls by an electrostatic field supporting it in a constant position.

A completely new approach will also be developed by future space technology toward the delicate process involving deposits of single-atom layers from metal vapors. These kinds of deposits are of the utmost importance as protective coverings for optical surfaces, in applications of electrical conductivity, and so on. In addition, they are indispensable for the construction of high precision optical instruments such as interferometers, laser mirrors, and mirrors used to reflect in the X-ray band. The absence of gravity and of the distortion caused by atmospheric gases--mainly by oxygen--should guarantee a rich future for these technologies.

Let us return now to the ISO program to which we referred earlier, and to the need to solve the problem of cooling the operational parts of the satellite during the activity of monitoring and observing radiation in the infrared band that it will carry out in space. The ESA technical experts have just completed development of a special HELIUM CRYOSTAT of a suitably small size. This cryostat will ensure correct functioning of a wide range of delicate devices such as separation valves for fluids in various phases, heat exchangers, and thermodynamic equipment--all of which could be severely damaged by increases in temperature.

We must also mention that, in the sector of applied electronics, projects are being studied for solving a variety of other problems which specifically concern the environment represented by the space immediately surrounding the earth. We shall refer here to just two specific examples of these studies; first, the danger of a loss of electrical insulation in the external equipment because of the flow of changes contained in the solar wind and, second, sudden fluctuations in the electrostatic field in which low-orbit satellites travel, as a result of magnetic storms which can always occur in the geomagnetic field.

Toward the 21st Century

The ESA is planning to implement its long term program on the basis of "orbiting infrastructures" which will make it possible for teams of astronauts to acquire experience both in pressurized environments (such as that already tested in SPACELAB, a mission in which, for the first time, an ESA astronaut, Ulf Merbold, tested his mettle in a space mission), as well as in the far more dramatic conditions of open space.

The most striking example of the first type of experience (that is, in a pressurized environment) will be the COLUMBUS station, which already has become famous. This station will consist of four interconnected pressurized modules. However, the Columbus program will almost certainly not be implemented before the end of this century or, at the very earliest, somewhere in the mid-1990's. There is one other program, however, which does seem to be closer on the horizon, despite the considerable delays caused by the temporary interruption of the shuttle flights, delays which we have already pointed out on a number of occasions. This is the EURECA program (European Retrievable Carrier) for a retrievable instrument carrier.

This carrier has to be launched using a launcher with a suitable capacity. Up until today, the shuttle has proved to be the only suitable candidate for this task. Once launched into a low orbit, the propulsion system of the EURECA will carry it to a distance of 500 km from earth. It will then remain in this orbit for long periods -- about 5 or 6 months for each mission. The EURECA will be manned by teams of experts working in shifts who, during these periods in orbit, will mainly carry out experiments in conditions of microgravity or of absolute weightlessness.

Upon completion of the scheduled period in orbit, the carrier will use its own independent systems to descend to the upper limit of the atmosphere. At this point, the waiting space shuttle will retrive the carrier in its roomy hold and return with it to earth.

8616

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FINNISH, SWEDISH INSTRUMENTATION ON USSR PHOBOS PROBE

Stockholm NY TEKNIK in Swedish 2 May 86 p 8

[Article by Jussi Westman]

[Text] Soviet scientists estimate that by May 1989 they will be able to soft-land a space probe on the inner moon of Mars, Phobos, to study its surface structure.

The flight will carry a Swedish-Finnish instrument, the plasma spectrometer Aspera, which will measure the energy of the solar wind during the 200-day flight.

In July 1988 two Soviet space probes of a new type, called Phobos, will be sent toward Mars and its moons.

Phobos-1 will be aimed at the inner moon Phobos, an irregularly shaped body with dimensions of 27x21x19 km, which travels in an orbit 9,700 km from Mars.

If the Phobos-1 experiment is successful, then the second probe, Phobos-2, will be reprogrammed to examine the outer moon, Deimos.

Deimos is smaller, measuring 15x12x11 km, and circles Mars at an altitude of 20,000 km.

The flight from Earth to Mars takes about 200 days. In February 1989 Phobos-1 will approach the planet Mars and will be placed in orbit.

After 23 days of measurements and photographic studies of Mars, the probe will be transferred into a new orbit extremely close to the moon Phobos.

50 Meters Over Phobos

The propulsion unit will then be discarded and the space vehicle's orientation unit will bring it in from about 30 km to just 50 m above the surface of the moon.

Two landing craft will be released and sent to land on the surface itself. The main space vehicle will analyze the surface material by bombarding it with

a laser gun and with an ion gun. The loosened atoms and molecules that are thrown up toward the space craft can then be measured and weighed by mass spectrometers.

The laser instruments are being constructed jointly by the Soviet Union, Bulgaria, the two German states, and Czechoslovakia. The goal of the experiment is to learn about the chemical, elemental, and isotopic structure of the little moon.

35 Different Experiments

The isotope distribution, in particular, can give some hints as to its origin. The ion bombardment is a Soviet-French experiment that is designed to determine how the solar wind affects the surface material.

The Phobos spacecraft carry a total of 35 experiments, which must be a record for an unmanned vessel used for planetary research. The experimental equipment includes a radar device capable of charting Phobos within an accuracy of 35 cm.

Two special instruments will be directed toward the planet Mars to analyze how sunlight is changed as it passes through the atmosphere of Mars. While the spacecraft is in orbit around Mars, it will be used in an attempt to determine whether or not the changing seasons cause measurable variations in the composition of the atmosphere--whether or not water is released during the spring, for example.

The two landing craft carry six experiments, which are carried out by photographic equipment, seismic detectors, a penetrator to measure the mechanical strength of the surface of Phobos, and spectrometers to analyze the free molecules present near the surface. The landing craft will operate for approximately 1 Earth year. The goal is for the series of measurements to provide exact information on the moon's orbit, the tidal effects of Mars, and conditions on the surface.

Half-Swedish Solar Wind Meter

One of the instruments on the Phobos probes will be a Swedish-Finnish plasma spectrometer (Aspera), a device that will measure and analyze the energy and composition of the solar wind during the flight to Mars. In the orbit around Mars, the instrument will examine molecules and atoms that are knocked out of the outer atmosphere of Mars as a result of the solar wind. If Phobos-2 is directed toward Deimos, then Aspera will also measure gas emissions from that moon, which have been detected previously.

Aspera's design is based on the earlier plasma spectrometers Promics-1 and Promics-2, which the Geophysical Institute in Kiruna previously constructed for the Soviet satellites Prognoz-7 and Prognoz-8. Aspera will be a more highly developed version that, in addition to making the actual measurements, will also be responsible for some of the calculations and data analysis.

For Sweden, the Aspera project means a continuation of previous aerospace work.

Finland got its chance when the geophysicists in Kiruna contacted their Finnish counterparts at the Geomagnetic Laboratory of the Meteorological Institute. The two institutes had collaborated previously.

The Soviet Academy of Sciences supported this cooperation and, for once, financial backers in Finland reacted quickly enough. The work itself has now been underway for 1 year.

9336
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BRIEFS

NEW EUROPEAN AIRBUS--Airbus Industrie has passed the 500-aircraft mark. Thanks to two new orders from ALIA [Royal Jordanian Airlines] (Jordan) and CAAC [Civil Aviation Administration of China] (PCR), 540 planes were firm sales by mid-May, 59 of them since the beginning of this year. Assembly of the future small A-320 Airbus has effectively begun in Toulouse. The plane is selling well (and on plans) with 134 orders confirmed by 12 companies and 133 already on option. Research continues for the launching of the A-340, a four-engine, very long-range aircraft capable of flying more than 12,000 km: The French government approves, provided, however, that banks join in and support part of the operation. In view of the cost of this type of financing, manufacturers are still hesitant. [Text] [Paris SCIENCES & AVENIR in French Jun 86 p 7] 25006/12223

AEROSPATIALE GETS EUTELSAT--The European Organization for Satellite Telecommunications has chosen between Matra and Aerospatiale: Its second-generation Eutelsat II equipment will be developed by Aerospatiale's European consortium. This assignment involves 225 million ECU for the construction of three satellites (with an option for five additional satellites) and is the largest contract ever given to European industry in the field of operational telecommunications satellites. The new system is designed to increase routing capacities in space and will succeed the four existing European Communications Satellites, the last two of which are to become operational in July 1986 and spring 1987. The prospective launching date for the first flight model of Eutelsat II is mid-May 1989. [Text] [Paris SCIENCES & AVENIR in French Jun 86 p 10] 25006/12223

CSO: 3698/A161

FRG MEDICAL BOARD GUIDELINES FOR HUMAN EMBRYO RESEARCH

Stuttgart BILD DER WISSENSCHAFT in German No 7, Jul 86 p 46

[Excerpt: "Guidelines of German Medical Association"]

[Text] "Dissent," i.e. lack of unanimity is a term which crops up several times in the guidelines "on research into early human embryos" issued by the "Bundesaerztekammer" [German Medical Association]. Nonetheless, 38 of the 40 members of the "scientific advisory council" voted in favor of the following statutory regulations:

There is a fundamental prohibition of

- the production of embryos for experimental purposes;
- the production of embryos from the reproductive cells of dead persons;
- the use of embryos for routine tests;
- cloning;
- the fusion of embryos of one or more types (chimerization and hybridization).

Research on embryos is not permissible, if

- animal experiments are possible;
- it is of no direct or indirect benefit to medicine;
- there is no guarantee of high scientific and methodological standards.

Conditions to be met in embryo experimentation are that

- the embryos are no older than 14 days;
- the duration of deep freeze conservation has been coordinated with the controlling agency;

- the genetic parents have been fully ascertained and have subsequently given their approval;
- no one has been forced to take part in such experiments;
- the experiments serve to bring about clinical progress in in vitro fertilization and in embryo transfer or
- that the experiments are of benefit to basic research in medicine.

Methods may also be employed in conducting the experiments which result in the decomposition of the embryo and its subsequent destruction. Embryos may only be turned over to others, if there is a guarantee of compliance with the regulations.

All experiments on embryos are subject to the control of

- the local or regional ethics commissions;
- the central commission of the German Medical Association.

The composition of the German Medical Association commission made up of representatives of

- the Max-Planck Society
- the German Society for Research;
- the scientific professional associations;
- the working group of ethics commissions;
- jurisprudence;
- the ethical disciplines;
- the Bundestag;
- the Bundesrat;
- public life.

The responsibilities of the commission include

- supervision of the guidelines;
- providing advice to the local and regional ethics commissions;

- keeping an eye on international developments;
- providing information to the local and regional ethics commissions, the foundations, the regional chapters of the German Medical Association and to the publishers of professional literature about the work of the commission;
- submitting annual reports to the parliaments and governments.

9478
CSO: 3698/590

OVERVIEW OF FINNISH BIOTECHNOLOGY INDUSTRY

Helsinki HELSINGIN SANOMAT in Finnish 8 Jul 86 p 16

[Article by Hannu Sokala: "Biobusiness Sprouting"]

[Text] At the end of the year, Suomen Sokeri raised tens of millions of markkas for biotechnological research through its share issue.

In the spring, Orion patented an invention which facilitates tracing the causes of diseases.

In the week of the Midsummer, the Oulu University announced that it will establish a biotechnological research center.

This year Finnish companies will spend about 100 million markkas on biotechnological research. We are moving toward the latest revolution in technology in which the weapons used are cells and genes.

With the help of biotechnology, man will make microbes, which are invisible to the eye, perform various tasks.

Micro-organisms are used for the production of drugs, beer and cattle feed. They are used to purify waste water and to transform grain into fuel. If everything goes as the most optimistic people hope, biotechnology will be used to solve the world's problems of famine and energy, to save the ecology and to heal the sick.

In Finland, the companies leading the biotechnological research are Kemira, Alko, Suomen Sokeri, Valio, Orion and Farmos. In addition, the use of micro-organisms, or microbes, is studied in the State Technological Research Center and at the universities. The most famous Finnish researchers are Artturi Ilmari Virtanen and Kari Cantell. Virtanen invented AIV feed and Cantell is doing research on interferon.

In the spring, Orion announced an invention which facilitates finding bacteria and viruses which are difficult to trace.

The method developed by Marjut Ranki and Hansa Soderlund has already been patented in various countries of the world. The giant American company DuPont became interested in the invention and paid 5 million markkas, just as downpayment for the licence.

"We are looking for new applications of the invention in the future. Such applications could be, e.g., precise identification of different forms of cancer and genetic diseases," says Hans Soderlund.

At Orion, 250 people are involved in bio-medical research. A group of 15 people is doing research on the so-called new biotechnology. For centuries people have manufactured beer, bread and cheese biotechnologically. In biotechnology, the microbes chemically alter a material, just as yeast alters flour. The new biotechnology is developing new methods for the utilization of microbes.

At the New York stock exchange, this year has been called the year of biotechnology. Biotechnological companies are expected to change from research laboratories needing money into companies making money.

The American company, Genentech, established 10 years ago, is the biggest name in biobusiness. Last year the turnover of the company, called the new IBM of the business world, was 450 million markkas, but its market value is estimated to be 10 billion.

Last year Genentech introduced a drug based on man's growth hormone and this year it is expecting a licence for a heart attack drug.

The stock exchange in Helsinki also has reacted to the microbes. The shares of Suomen Sokeri are among the fastest rising shares in the exchange. Suomen Sokeri is concentrating on the study of the use of enzymes, or macromolecular proteins, in foodstuffs and cattle feed.

At the end of the year, the company raised 88 million markkas through its share issue. The funds are particularly needed for biotechnology and the turnover of the international group studying it has almost doubled every year. The most significant, and so far the most profitable research object has been the glucose isomer that is used in the manufacture of starch syrup, and the company announces that it has taken "a considerable share" of the world market.

Among the state-owned companies, Kemira and Alko are investing heavily on biotechnology. The investments are in such a category that Seppo Lindblom, minister of trade and industry, has said that the role of Alko may change from social politics to industrial politics. Alko's microbes make alcohol, yeast, vinegar, cattle feed, and enzymes. A very large share of the company's 30 million markkas' research budget goes into biotechnology. The group, which has been working for 5 years, is developing new proteins and yeasts.

Kemira's biotechnology is concentrating on agriculture. Among its inventions, the one entering the market very soon is a product which prevents various plant diseases.

Kemira owns part of Calgene company in California which studies plants. Kemira keeps the number of its shares, as well as its research budget, secret.

Flybacteria and Milk for the Allergic

Farmos is currently seeking a sales licence for a bacterium which kills maggots, but leaves other animals, people and plants alone. The company is expecting a worldwide market for this fly bacteria.

At Farmos the biotechnological research is conducted in the group of agriculture and drugs. This year about 3 million markkas will be used on research.

Valio spends 10-20 million markkas on research. The most important research object which has been introduced on the market is whey. While as late as at the beginning of the 1960's, most of the whey was wasted, half of it is today used in foodstuff and the other half in cattle feed. Valio is now investing on the research of the so-called clinical nutrition, i.e. it is developing special types of foods, e.g. for poeple with cancer or allergies. Milk suitable for children with milk allergies is currently being tested on animals.

Several drugs can only be manufactured with biotechnological means. Microbes produce antibiotics, hormones, insulin and vitamins.

For example Huhtamaki is doing research on antracyclin antibiotics, which can be used in treating cancer. Antibiotics are now ready to enter clinical testing, and they are expected on the market in a few years. Three to four man-years of labor are used in the research.

Medix Biochemica, operating at Kauniainen, was the first in the world to introduce, at the end of the 70's, the so-called monoclonic antibodies to be used in diagnostic industry. There are new products coming onto the market, but Medix will not discuss them in advance. The company uses 3 million markkas a year on research and it exports over half of its production.

Sugar beet, sugar cane, barley, wheat and peat, among others, can be used in the manufacture of ethanol, which can be used as fuel. For example Brazil has developed methods which can be used for leveling off its mountains of sugar cane which will be used as ethanol. The country is going to substitute ethanol for its imported gasoline during the 1980's. Microbes know how to eat industrial wastes. At the same time, the microbes' own wastes can frequently be utilized. The sugar contained in the waste water of Mantta cellulose plant of Serlachius is made into 7,500 tons of ethanol and 5,000 tons of feed protein per year.

Since last fall Enso-Gutzeit has experimented at its Kaukapaa plants with a sewage treatment plant, which has diminished the oxygen demand of waste waters by half and the amount of toxic chloric phenols to a tenth. Enso uses about 1 million markkas a year on biotechnological research.

To World Market with Billion-Markka Inventions

With Genentech in the lead, biotechnology is the investors' favorite in the United States.

"Also in Finland the growth potential of biotechnology is enormous. Here, the shares of Suomen Sokeri have become interesting, particularly due to biotechnology. In the 1970's Sokeri shares were sold at par. Now the effective yield of the shares is among the best at the exchange," reports Kim Lindstrom, an enterprise analyst from Unitas Oy.

In Finland biotechnology is burdened by the sparsity of Finnish venture capital. Those who are playing it safe are afraid of ferments and lab systems.

Some Finnish companies announce without hesitation that they aim at a billion-markka invention and entering the world-wide markets. However, the research investments are peanuts compared with the programs of large multinational companies. "With investments of some millions of markkas, one will not make inventions worth hundreds of millions," says Kalervo Eriksson, Alko's production and research director.

"Some companies give too optimistic a view of the future in order to guarantee their funding. Only the largest international companies will do well in the new biotechnology," he believes.

Just before Midsummer, the Oulu University decided to establish Finland's first biotechnological research center. The operation of the center will be financed mainly with funds from outside.

12956
CSO: 3698/553

BRIEFS

BELGIAN BIOINDUSTRIES ASSOCIATION--Five Belgian companies active in the bioindustrial sector have joined to form the Belgian Bioindustries Association (BBA). Their goal is, on the one hand, to intensify their cooperation with Japan and, on the other hand, to encourage European and national authorities to adapt biotechnology regulations to the needs of research and industry. The association, founded in March 1985 by Arbios (ACEC [Electrical Construction Works of Charleroi]), Oleofina, Foridienne, the Raffinerie Tirlemontoise, and UCB [Belgian Chemical Union], wants to expand and has opened its doors to any Belgian company involved in biotechnology that would like to share its objectives. BBA has had a representative in Tokyo since last January to develop contacts between Japanese businessmen and representatives of the association's member companies. [Text] [Brussels INDUSTRIE in French Jun 86 p 11] 25006/12223

CSO: 3698/A156

AIRBUS INDUSTRIE DISCUSSES COLLABORATION WITH U.S. FIRM

Hamburg DIE ZEIT in German 20 Jun 86 p 19

[Article by Heinz Michaels: "Two Against Boeing?: The European Airbus Industrie Negotiates Cooperation with McDonnell-Douglas"]

[Text] Geoffrey Pattie, British minister of trade for Queen Elizabeth II, predicted this development far in advance with the remark that that would then be "two against Boeing." The two he refers to are Europe's Airbus Industrie and America's McDonnell-Douglas, both builders of aircraft, both competitors of Boeing, the world's largest producer of civilian aircraft, but both also up to now competitors of one another. At the International Aerospace Exhibition in Hanover, Martin Gruener, the parliamentary state secretary at the federal ministry for economics on Thursday of last week unexpectedly let slip that an offer of cooperation had been made by McDonnell-Douglas to Airbus Industrie. The discussions had already begun three months ago. Conversation in the ensuing days at the company bars in the exhibition booths centered on whether Gruener let the remark slip out unconsciously or whether it was an intentional public disclosure.

Representatives of the governments involved in Airbus Industrie--the FRG, France, Great Britain and Spain--were meeting in Hanover to move forward on the joint Airbus program--in particular the development of the long-range A 340 jet and the large A 330 Airbus. In the usual communique style, the governments also declared that they were prepared to investigate "the question of financial support for the A 330/A 340 program"--providing that the economic outlook proves stable.

Those who read between the lines conclude that now the English, too, whose Prime Minister Margaret Thatcher viewed the project with extreme scepticism and did not want to spend any money on it, are again back in the fold. "The ministers," the communique continues, "welcomed attempts to broaden the base of international cooperation."

However, this cannot yet refer to the American offer, because, an Airbus manager assures us, "We have not yet spoken with McDonnell-Douglas about the new plans." The Airbus people have been talking for months with the Italians, the Dutch, the Japanese, the Canadians and the Australians in attempts to broaden the base for their new project which will require development costs of about $2.5 billion (about DM5.6 billion).

The proposal out of Long Beach near Los Angeles, where McDonnell-Douglas produces its transport aircraft, has landed in the chancelleries of the governments involved and also on the desk of the Bavarian minister president, Franz Josef Strauss, who is the chairman of the board of Airbus Industrie. In it the Americans offer their assistance in the A 330/A 340 project and outline cooperation in other future projects. The Airbus managers now intend to sound out just how serious the proposal is.

The Airbus program, however, will in no way be delayed by these discussions, emphasizes State Secretary Martin Gruener. This assurance was also necessary because several airlines, including Deutsche Lufthansa and Swissair, are waiting impatiently for the four-engine, long-range Airbus which they want to use on "thin long-distance flights" in which the jumbo jets are not economical due to low passenger counts.

The wording, however, also expresses the concern that the Americans, as has happened on earlier occasions when Airbus had plans for new types of aircraft, were only interested in bringing the new programs down. But times have changed.

When McDonnell-Douglas proposed a cooperative effort in the 1970's, Airbus was at a low point and the Americans thought they could dictate to the Europeans the terms of their salvation through cooperation. In the meantime, Airbus Industrie has achieved a better position within the civilian aircraft construction industry than McDonnell-Douglas.

To date the Europeans have sold a total of 544 aircraft, 134 of which are the small A 320 jets which will not begin flying until next year. Since the beginning of 1985 alone, 155 aircraft have been ordered; thus, except for one, the stockpile of 30 unsold planes has disappeared. On the other hand, until a year ago many observers of the civilian aircraft market were counting out McDonnell-Douglas altogether. Former Airbus president, Bernhard Lathiere, for example, was geared totally for a head to head battle with Boeing.

Three years ago company head Sanford McDonnell was even thinking out loud about giving up completely the construction of civilian aircraft. The company seemed resigned to the same fate as its neighbor in Los Angeles, Lockheed, whose Tristar was scarcely selling at all and which therefore decided to give up the difficult civilian end of the business in order to concentrate entirely on lucrative military contracts.

But then one year ago the head of sales, Lou DiLeo, introduced a new plane from McDonnell-Douglas at the Paris Air Show, a three-engine, long-range aircraft for 330 passengers. It was the MD-11, a further development of the successful DC-10, of which Lufthansa and its subsidiary Condor, for example, have 14 in operation. This was a clear challenge to the planned long-range Airbus, the development of which was not yet assured at that time.

"We will officially offer the aircraft to the airlines in August (1985) and hope to receive our first orders this year yet," said DiLeo, and casting a sidelong glance at Airbus added with typical American sales optimism: "I do not believe that we will both be in the market, but I am convinced that /we/

[in italics] will be." His reasoning: With its lower operating costs the MD-11 would be superior to the planned Airbus.

At the time the assembly buildings at Long Beach were empty. Orders for the DC-10 dribbled in only slowly. Salvation came from the U.S. Air Force which ordered 60 KC-10's, a tanker version of the DC-10 for refueling combat aircraft in flight. Then the company management tried to ensure full production for the next few years with the MD-11. However, their ostensibly new airplane met with little enthusiasm from the airlines. To date no sales contract has been signed. Half a year after the projected take-off date the plane's fate is still uncertain. The heads of engineering at the airlines are nearly unanimous in their view that the plane is just a new face on old technology. Sanford McDonnell might well be asking himself again: Should we give up on civilian aircraft production?

Against this backdrop, the Europeans view this offer of cooperation with extreme scepticism. "We smell a rat," says one of those involved. The Americans are probably most interested in keeping production of the DC-10 going.

The suggestions coming out of Long Beach also indicate the same thing. Airbus Industrie, says McDonnell-Douglas, should give up on the A 340 and instead participate in production of the MD-11. And the Americans would also like to supply MD-11 wings for the medium-range A 340.

The Europeans agree that this will not work. The governments involved are firm in their commitment to the A 330/A 340 project. If McDonnell-Douglas wants to participate in it, fine. The impending negotiations will therefore likely involve a difficult tug-of-war; however Airbus Industrie is in a better position than it was in past years.

Naturally, it would have been a simple matter to just dismiss the American proposal as a nuisance maneuver. Viewed more realistically, however, there is an opportunity to coordinate the activities of Airbus and McDonnell-Douglas to mutual advantage. The lack of orders for the MD-11 will have to make the Long Beach managers give up their dream of winning 25 percent of the civilian aircraft market. Jointly with Airbus Industrie, however, the two could achieve the 30 percent market share the Europeans are shooting for.

"To do that, however, we would also have to talk about the smaller aircraft," pondered one Airbus manager. What he means are aircraft with 120 to 170 seats where the Airbus A 320 competes with the MD-80 family of McDonnell-Douglas aircraft.

For the Europeans such cooperation offers the opportunity to gain a better foothold in the American market where about half of all commercial aircraft are sold today (one quarter each are sold in Europe and the rest of the world, not including the East Bloc). To date only four U.S. airlines fly European Airbuses.

As an incentive for the Europeans the Americans have included in their proposals a plan finally for joint development in the 1990's of a plane which can compete with Boeing's 747 jumbo jet. In the case of large aircraft for 350 to

500 passengers or more, the Seattle aircraft company has a monopoly which has long been a thorn in the side as far as the boards of directors of the airlines are concerned.

Upon receipt of a jumbo jet, Reinhard Abraham, the Lufthansa board member in charge of engineering, last year read the riot act to Boeing's management. At $100-120 million (DM 170) the jumbo jets are simply too expensive, he said. Experts estimate that Boeing earns at least $20 million dollars on every 747 jumbo jet.

Breaking up this monopoly and all other plans are no more than visions of the future and pipe dreams based on splitting in two an international market for commercial aircraft which is estimated to be worth $500 billion or more than DMI trillion marks over the next two decades.

Geoffrey Pattie summarized the situation aptly: Two against Boeing.

12552
CSO: 3698/560

AUSTRIA RESISTS ROLE AS CUSTOMER FOR AIRBUS PARTICIPATION

Vienna DIE PRESSE (ECO-JOURNAL Supplement) in German 20 Jun 86 p 5

[Article by Hedi Cech: "Crash Even Prior to Takeoff ?"]

[Text] "After a disastrous dress rehearsal there should be a successful first night." Helmuth Weiser, deputy managing director of the Association of Austrian Supplier Exporters, is not giving up on his hopes that domestic firms will participate in the planned Airbus A330 and A340 programs in the end. "By doing so, we would not only have access to the international high-tech club but would also be creating about 800 jobs for highly qualified skilled personnel. What is more, interested firms such as VEW, AMAG, Elin and Fischer, for instance, could be working on long-term contracts for as long as 15 to 20 years," Weiser said, in explaining the reasons for the new effort.

The plan is for a participation on the order of about one percent of the total project being underwritten by France, Great Britain, Spain and the FRG at an overall cost of $2.6 billion. The type of participation being envisaged is that of a risk-sharing subcontractor, which has the supplier acting as a co-entrepreneur--but one who only develops and manufactures specific components or modules.

But before this cooperative venture can become a reality, the subcontractors who have formed a working group called "Austrian Aerospace Industries" specifically for this project will have to expect to encounter a few more difficulties. One of them is that the government, which would have to underwrite a large part of the development costs (amounting to some 2.5 billion schillings in case of a one-percent share) in order to provide and cover the credits for the contract partners, is asking for concrete decision criteria and the agreement in principle of Austrian Airlines.

The "Deutsche Airbus GmBH" [German Airbus Ltd], as a direct partner, is also calling for participation by the Austrian airline which is also being viewed as a potential customer. Interest in a partnership increases in direct proportion to the volume of sales opportunities, Munich has let it be known.

But it was the negative attitude by Austrian Airlines head Anton Heschgl which already put an end to the first attempt to participate in the construction of the A320 Airbus in 1982 "even though the then Minister for Transport, Ferdinand Lacina, lent us his support," Weiser said. But this time, too, Heschgl has voiced "the most serious reservations."

In the case of the A320 there would have been an obligation to purchase a number of aircraft. That would surely be the case again this time--but he was not prepared to enter into any such obligation. (Austrian Airlines has two A310's on order on which delivery is expected by late 1988, as ECO-JOURNAL has already reported).

"If we are asked to make a statement, then we will have our technical people look into the matter. But judging by my experience last time, I do not think it will work out," the Austrian Airlines head told us. For the time being, he is unwilling to change his mind--the more so, since he anticipates problems in the sale of new medium-range and long-range airplanes. On this, as a matter of fact, he disagrees with the Bonn ministry for economics which takes a positive view of the outlook for the Airbus family of aircraft. Since early 1985 alone, 155 planes are said to have been sold.

In theory, if Austrian Airlines says "no" to the deal, the project is virtually certain to collapse. Nonetheless, Weiser seems to detect a ray of hope "in the sense that Lacina, as the new minister for finance, will be able to come up with a positive decision." But there is a danger that the ball will be thrown back and forth for such a long time that the Germans finally lose interest in a participation.

Which would prove embarassing for the subcontractors' association and disappointing for domestic industry. Elin, the state-run electrical concern, for example, has expressed a great deal of interest in the electric and electronic field. "We have supplied components for the A300 and the A310 on our own already," said Hans Langwieder. "But our goal is to develop entire modules for the onboard power systems on our own and thereby to go beyond the role of a mere "extended workbench." The Upper Austrian firm of Fischer, which manufactures sporting goods, has also had a good deal of aerospace experience. The firm has just signed a $500,000 contract with McDonnel Douglas. "We are presently developing two projects for the A320 which are bringing in orders amounting to $1.5 - $1.8 million this year," research director Walter Stephan said. "For 1987, we already have pledges for $4 million." One more reason why official participation in the Airbus undertaking would be of interest to private industry. Another positive feature, according to Stephan, would be that Fischer could then create about 50 additional highly specialized jobs.

9478
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PHILIPS DEVELOPS EXPERT SYSTEM FOR CHEMICAL ANALYSIS

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German 23 Jul 86 p 5

[Text] Frankfurt--The Hamburg research lab of the Philips company has created an expert system, under the name EXPERTISE (Expert System for Infrared Spectra Evaluation), with which the evaluation of the infrared spectra of unknown substances should be possible. Through this, allowances should be made the change in analytical chemistry towards the application of spectrometers and chromatographs. Using these work methods, it should be possible to determine the physical characteristics of substances more directly, more comprehensively and more simply than is the case with conventional wet chemistry methods, Philips reports. In the meantime, the assessment of automation is reportedly being carried so far as to regard an analyzer ultimately as merely a "complex sensor for computer programs."

It is true that the evaluation of chemical data is characterized by being prone to error and impossible to repeat exactly. To this extent, these analyses cannot be compared to office applications. In the process developed in Hamburg, such uncertainties are approached using the method of indeterminate quantities. In this theory, the concept "belongs to" is replaced by the less determinate term "belongs to a certain extent to," and thus by a property value in the range between zero and one. Infrared spectroscopy is so important, Philips feels, because the spectra present a high information content.

An experienced analyst can apparently distinguish the entire structure from it. In keeping with practice, the expert system also reportedly permits the evaluation of spectra using two different methods. On the one hand, there is the direct comparison of an unknown spectrum with reference spectra from a library--a particularly reliable means of distinguishing compounds that are available in the library. In the other method, substructures in infrared spectra are shown through characteristic lines that are distinguished by the expert system and can be fit together into total structures. However, this is qualified by the fact that only spectra of pure substances can be used. Also, the expert system reportedly cannot in any sense replace the chemist in the performing analysis. At the same time, however, such computer programs could in the future become important components of the overall analysis process.

By its own account, the Philips research lab in Hamburg has recently been working predominantly on computer methods for simplifying the analytical equipment. In the process, methods for the evaluation of spectra through distinguishing spectral lines and for looking up reference lines in large libraries. Recently, the focal point of research has reportedly been infrared spectroscopy. However, work is supposedly also being done on a system for supporting the configuration of chromatographs.

12271
CSO: 3698/595

BRIEFS

ESPRIT: INDUSTRIAL AI APPLICATIONS--Frankfurt--Within the framework of the European research program Esprit, ways are being sought to apply methods of "artificial intelligence" to industrial control and monitoring systems. Thus, the four enterprises Krupp Atlas Elektronik GmbH in Bremen, British Telecom in London, Framentex in Paris and Queen Mary College of the University of London are working jointly on the KRITIC (Knowledge Representation and Inference Techniques in Industrial Control) project. Through it, it is intended that special software and computer architecture programs be drawn up that are capable of handling complex industrial applications. Research is being done on questions of knowledge representation and inference methods, as well as the treatment of time-dependent input and output, because this involves predominantly dynamic problems. Questions of machine learning will also be dealt with, Krupp reports. [Text] [Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German 17 Jul 86 p 7] 12271

CSO: 3698/595

EUREKA PROJECT FOR 'OPTRONIC' FLEXIBLE WORKSHOP

Paris LES ECHOS in French 7 May 86 p 14

[Article by Anne-Marie Blanchet, "Eureka: An All-Optoelectronic, Flexible Workshop"; first paragraph is introduction]

[Text] Light will be the preferred tool of this workshop created within the framework of European research. From manipulators to the movement of parts through the use of communications systems, lasers are everywhere.

The all-optoelectronic, flexible workshop is one of the priorities of the Eureka program. The project, implemented by the General Computer-Integrated Manufacturing Company (CGP), a subsidiary of the CGE [General Electric Company], is based on the bet that lasers will be the mainstay of workshops 15 to 20 years from now. From this comes the idea of combining various types of these instruments in a pilot plant, depending on the applications.

A continuous carbon dioxide 7-kilowatt power laser mounted on a manipulator will thus carry out cutting, welding, or heat treatment. "This versatility," says Gerard Minouflet, assistant to the general manager of CGP, "eliminates time lost in moving products from one machine to another and in changing tools; these activities are replaced by switching from one program to another, a substitution which triggers automatic adjustment of the optical settings.

"It is expected that this absence of discontinuity in the course of production will result in very short fabrication periods and optimum use of the machines."

"Moreover," adds Guy Bondoux, general manager of the company, "since the supports of the parts remain the same whether a product is to be changed or treated, the standardization of the pallets will be expressed by a not-inconsiderable reduction of investment."

Furthermore, light offers much more freedom of work than conventional tools. In cutting, it usually works faster, allows fillet plane paths and lessens thermal effect in the tooled material. On the other hand, the surface condition of the latter is not entirely smooth, and if the substrate is too reflective (aluminum, gold,...) the light beam no longer works.

In welding, the laser equipment allows edge-to-edge assembly without addition of material and without significant deformation of components, thus making it possible, for example, to weld a gear to a shaft directly.

"As far as surface treatments are concerned, the particular setup usually required is eliminated," Gerard Minouflet observes. "The part does not have to be preheated, nor does all of it have to be treated, with all the material that this involves; unlike other processes, the manipulator works at ambient temperature, solely on the portions previously chosen, and even if these are hard to reach."

The services offered by the CO_2 laser manipulator will be complemented by the possibilities offered by the Yag-pulsed robot laser. The latter is usually more precise than the continuous laser, but is slower. It will be used for drilling, microcutting and microwelding of small parts of a few centimeters in size. Its uses will also include burring and marking, taking on the advantages of being indelible and applicable to rounded surfaces, that is, on the finished product. Besides this novelty, the lack of contact between the beam and the part avoids all soiling and deformation and furthers very high unwinding rates. The laser pattern, point for point, is moreover very well defined.

Interconnection by Local Network

Useful also in an assembly robot, the laser will in that case adjust its location by triangulation. In other words, by means of information supplied by the beam the instruction will set the final location of the terminal device. This arrangement is intended to preserve the accuracy of the robot, while simplifying and reducing the volume of the mechanical construction, in order to lower equipment cost considerably.

Interconnection of the machines and the command subassemblies will be secured by a local fiber optics network and the movement of parts by a laser-controlled automatic carriage. The apparatus on board the vehicle will in fact sweep the space and detect markers judiciously placed along its route.

Spread over 5 years, the project is estimated at Fr 500 million, and will start in September. Aside from CGP, it involves Cilas for the CO_2 robot laser. CGEE-Alsthom will be responsible for the local network and Sesa will be in charge of running the workshop. Also associated with the program are Fiat and a Swiss company (SMH).

"Our goal," says Gerard Minouflet, "is to make this optoelectronic workshop as versatile as possible." Although it is firmly directed toward mechanical fabricating, it is not ruled out that microelectronics components will be welded there. Plant specifications will not be precisely determined until preparation of the specification sheets is in progress, that is, during the first year of the program. Nevertheless, it is proposed to target the work on parts of from a few centimeters to one meter in size, weighing 200 grams to 200 kilograms.

The number of laser machines has also not been resolved. However, even if this center is to be a showcase for European optoelectronics, it is above all supposed to produce--rapidly, well, and at minimum cost. Our industrial credibility is at stake. "That is why this infrastructure will give services free of charge to any business wanting to test the feasibility of a process based on new technology or to fabricate a series of prototype parts."

"Finally," points out Gerard Minouflet, "potential users will participate in the planning of some of the work stations and in our optimization research so that industrial tools may be responsive to market requirements."

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FRANCE DEVELOPS ADVANCED ROBOTS IN 'RAM' PROJECT

Paris INDUSTRIES ET TECHNIQUES in French 1 Jun 86 p 75

[Article: "After ARA, RAM..."]

[Text] Placed under the responsibility of CESTA (Center for Studies of Systems and Advanced Technologies), the Independent Multiple Services Robot (Ram) program aims to set up the foundations for a third generation of robotics on a national plane, with effective cooperation on an international plane. Having gotten off the ground during the last year of the ARA [Automatisms and Advanced Robotics] program (research oriented), RAM itself is interested in applications, following the recommendations of a steering committee which includes all of the ministers concerned. Five subprograms have been defined:

--SINRAM, for nuclear robotics, guided by the Atomic Energy Commission (AEC) and funded by the AEC, the Ministry of Research, and the DIELI [Department of Electronic Industries and Informatics].

--A mining robotics subprogram, controlled by the Cerchar [Center for Studies of the French Coal Board] and funded by the MRT [(former) Ministry of Research and Technology], and the DIELI (discussions in progress).

--An industrial cleaning subprogram directed by a PMI, Midi-Robot, and funded by the Office of Informatics (ADI). RATP [Independent Parisian Transport System] is the main client for this activity, which today has been extended to industry under the aegis of a consortium including the CGE [General Electric Company], the AEC, Camiva and Genest.

--RAM-AGRI for agricultural robotics deals with forestry applications (RAFU) and fruit harvesting (Magali). Guidance is assured by the Cemagref, working with two PMI's (Valoris and Pelenc and Mott). Combined funding: Ministries of Research and Agriculture and regional governments.

--RAMA, subprogram of independent robotics in workshops. It is supervised by a PMI (12L) and funded by the Dieli. In 1985, RAM received approximately Fr 35 million, of which one-third is in public incentive credits. The 1986 funding is expected to be on the order of Fr 65 million.

RAM takes part in the international ARP (Advanced Robotics Project) program, administered by France and Japan. Also associated are "interested" countries (Italy, Great Britain, the FRG, Canada, the United States and Austria) and "observer" countries (the EEC, Norway and the Netherlands). Sites for cooperative studies are expected to be set up in various countries. France proposes Saclay or Cadarache (AEC) for nuclear robotics in hostile environments, as well as L'Aumance in Allier (Cerchar) for mining robotics.

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FLEXIBLE WORKSHOP AT FRG'S TRUMPF MAXIMIZES CNC USE

Paris INDUSTRIES ET TECHNIQUES in French 1 Jun 86 p 43

[Article by M.S.: "Machining to a Precision of 0.3 Millimeter"; first paragraph is introduction]

[Text] Trumpf has integrated the entire fabrication of its machine tools, from production management to machining, by using CAO [computer-assisted design] and logistics.

Ditzingen is a picturesque town near the gates of Stuttgart where Trumpf, a manufacturer of machine-tool for sheet metal, has made its headquarters since 1972. But also it has there its main plant, designed for the 21st century.

From computer-assisted design to computerized production management, nothing has been left to chance. The TC-APT programming system (Terminology Comprehensive for Automatically Programmed Tools), invented in-house, uses CFAO software designed by L. Csikor. It will soon have been in operation for 5 years. The PDP 11/23 computers are connected to the VAX and the cabinets of the machines in the workshop by direct numerical control. They communicate with the CAO system and, by way of the TC-APT, supply the geometry of the parts to the post-processors. The workshop hall, which supplies most of the parts for Trumpf's machines, is a first-class achievement. It is 100 percent flexible because, as explained by H. Beilke, assistant to the president, "We supply sheet metal machining systems adapted to the user's requirements."

The machine shop includes flexible cells for turning, milling and grinding--all within a precision range of $\pm$ 0.3 millimeter. The Deckel FLZ can machine more than 600 different parts, thanks to the 25 CNC [computerized numerical control] programs. A special cell is provided with a Jungenrich robot and a control system which grinds 15 different parts. At the end of the line, four machines make up an automated grinding island--just like the deburring cell, itself also provided with a manipulator.

The sheet metal work is done in a second workshop. This provides an opportunity for the constructor to test his machines in an automatized

installation. It includes a Trumatic 240 combined nibbling and punching machine with manipulator and a plasma cutter, also provided with a charging and discharging manipulator. A Trumatic machining center with a sheet metal manipulation system and a Manutec robot, which changes tools, complete the installation. The bed plates of the machines turned in France are welded on a robotized installation. Handling of parts between machines is done by wire-guided carriages.

The German constructor is designing a warehouse for finished and semifinished parts and for the tools. Wire-guided carriages will soon go back and forth between the machines and this warehouse. Its design is somewhat revolutionary because a robot on the carriages will take care of manipulating the parts and the tools. "Moreover, we have installed a Kanban-type fabrication tracker which will be supplemented by a second one, the MRP II, which will be computerized," H. Beilke points out. Fabrication tracking will be carried out from a special station being put in at this time.

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FINNISH NOKIA: DIRECTOR ON NORDIC, INTERNATIONAL PLANS

Helsinki HUFVUDSTADSBLADET in Swedish 20 Jun 86 p 18

[Interview with Nokia's new acting director, Simo Vuorilehto, by Carl-Gustav Linden: "Nokia--a State Within a State"]

[Excerpts] Last March Simo Vuorilehto was appointed executive vice president of Finland's largest private industrial firm, Nokia. He has almost 28,000 employees under him. Above him, he has the board and concern chief Kari Kairamo.

This is the result of last spring's major organizational reform.

"With regard to me, the greatest change was my official position. Previously I had been second vice president. Now I also have more visible responsible responsibility. In addition, Kairamo has withdrawn somewhat from the operational work."

Spiteful tongues are saying that Nokia carried out the reorganization simply so that Kari Kairamo could become head of the concern.

In general, the change means that an executive committee has been established, which consists of representatives of the owners. They were previously on the board. Members of management were moved up to the board.

"Nokia is already such a large and multifaceted international firm that it needs an organ that can concentrate on strategic leadership. This is precisely the task of the new board," said Vuorilehto who is executive vice president, board member, and director of management.

Kairamo is head of the concern and chairman of the board. Corporate law prevents him from being on the executive committee.

Spider In Web

"My task is to coordinate operations. It is my responsibility for us to achieve our daily results. I am also responsible for planning and allocating operational resources. It is the task of the board to determine development trends."

The executive committee is controlled by Foreningsbanken and Kansallis Osake-Pankki. They are the two largest groups of shareholders.

Nokia's largest individual owner after the issue of shares abroad is the investment group Quantum Overseas N.V., which in early May held almost 8 percent of the shares. They have no representative of their own in the top leadership of Nokia, however.

According to Vuorilehto, the owners actively utilize their power. The executive committee members are no figureheads. Jaakko Lassila, Mika Tiivola, and Kari Kairamo form the working committee of the executive committee.

"I see cooperation among the head of the concern, the board, and me as very business-like."

'Cellulose Cooker'

Simo Vuorilehto came to Nokia 10 years ago as head of the wood-processing industry. At that time, he replaced Kari Kairamo, who became executive vice president.

"Another cellulose cooker in top management," it was whispered in the corridors of Nokia when Vuorilehto became executive vice president in March.

"The first decision I successfully promoted when I came to Nokia was to close the cellulose plant within 8 years," Vuorilehto counters.

"Kari worked for a long time in the United States selling paper machines. I have worked mostly in the processing industry."

Before the Nokia period, their careers were different.

Vuorilehto will not follow Kairamo any further than the post of executive vice president. He is now 55 years old.

Best Known Company

Informal surveys on the street show that Nokia is the best known or second best known company in Finland. People associate Nokia with bright prospects for the future, according to public relations director Matti Saarinen.

But does not Nokia have a rather poor profile for an electronics firm--especially since Thomas Zilliacus went to Singapore?

Simo Vuorilehto and Matti Saarinen, Zilliacus' successor since January, looked at each other amusedly.

"I do not think so. In any case, the word 'poor' is totally wrong. In a way, a public relations director has a 'personal professorship,' with many

chances to combine his charisma with that of the company. Despite this, it is the director who is identified with the company. Just think of the combinations Wahlfors-Wartsila or Raade-Neste. In addition, Matti Saarinen is doing the job just as well as Zilliacus--without going skiing so often," Vuorilehta said.

Friends Of Ministers

The Nokia directors are men who are often seen in the company of cabinet ministers. That is natural. Many orders go to the public sector.

"The atmosphere in Finland is extremely positive. This also applies to Sweden. Compared to the industrialized world as a whole, the Finnish industry has good relations with the public sector," Vuorilehto said.

The Finnish state owns 49 percent of Tele-Nokia. The Swedish state owns 30 percent of Luxor. In France Nokia is planning a joint-venture company, together with the state-controlled electronics giant Matra.

State Within A State

Nokia, by Finnish standards an enormous industrial conglomerate with over 11 billion in sales last year and almost 28,000 employees, is a state within a state.

How big can Nokia actually become?

"The growth rate will decline proportionally. In Finland it is difficult to grow any more without changes in legislation that would permit diffusion. The Valmet-Wartsila deal, for example, could not be made if they had to pay taxes."

Vuorilehto believes that the Ovako-Steel deal, through its inter-Nordic structure, has gone even further. This is where he sees possibilities for Nokia's development, as well. The Nordic countries represent 60 percent of Nokia's markets.

"We hope that a Nordic company will be possible. I cannot say that we are planning this, but we are aiming at it and it applies to all our branches."

As examples, Simo Vuorilehto mentioned Nokia's paper and chemical industries.

Transformation

One thing that characterizes Nokia's strength is that it is constantly undergoing restructuring--an enormous transformation. Through the sale of companies, Nokia lost 1,370 employees last year. At the same time, however, 1,118 new employees were hired in its electronics branch.

Vuorilehto says that growth is a prerequisite, if Nokia is to be able to keep employment up.

"It depends on how well we are able to carry out the structural changes and how well we are able to compete. But we need more and more people who are highly qualified. You could say the the quantity of traditional labor is now at a maximum."

Last year the electronics industry grew by 40 percent, with 2.5 billion in sales, despite general stagnation on the world market. Nokia Elektronik is the fastest growing branch of Nokia. On 1 June the group was divided into three divisions: Information Systems, Telecommunications, and Nokia-Mobira. This also includes Salora-Luxor.

In the other groups, including the base industries of cable, metals, paper, chemicals, rubber, and plastic, sections continue to disappear, while new ones are added. Last year Airam, Ilmateollisuus, and the air conditioning division were sold.

Now Nokia will construct a plant to produce the bleaching agent hydrogen peroxide. This will cost about 200 million markkas and probably will be located in Joutseno. Production is already underway at Nokia's and Nobel Industrier's joint venture in Sundsvall, Kenox AB.

Money Available

This year Nokia will invest 1.5 billion in fixed investments and in research and development.

There is money available. Nokia is bringing in 660 million markkas in this year's two major share issues. This money will be used primarily to improve the company's capital structure. In this was, Nokia will be able to lend money under the same favorable conditions as its international competitors.

To this is added last year's accumulated profits: 482 million markkas net. Nokia had the highest profits in Finland last year. According to the firm's quarterly report, profits will be even higher this year.

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SIEMENS, ICL, THOMSON: AIDA CIRCUIT DESIGN TOOL

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German 23 Jul 86 p 5

[Text] Frankfurt--Within the framework of the Esprit program, Siemens, ICL and Thomson have begun the joint research and development program called AIDA (Advanced Integrated Circuits Design Aids). Under the project leadership of Siemens, it is intended that new design methods and "computer-aided design" tools for highly-integrated VSLI circuits with more than one million transistor functions be developed. According to information from Siemens, the project has resources of around DM 74 million (33 million ECU) over a period of 4 years. It entails total personnel expenditures of 300 man-years.

Siemens also reported that present-day design systems are capable of designing integrated semiconductor circuits with more than 100,000 transistor functions. Although these design systems begin to reach their limits at around one million functions, it is expected that semiconductor technology will be available within 5 to 10 years that will make it possible to place several million transistor functions on one chip. It is in particular for the design of complex logical circuits for these generations that new design methods and tools are to be developed through AIDA.

The AIDA project, in which Siemens, ICL and Thomson are cooperating as partners, is divided into the subprograms Logical and Electrical Synthesis (Silicon Compilation), Testing, Data Storage, Layout, and User Surface. These duties are distributed within the project such that the partners are able to apply their respective tools and experiences to greatest possible extent. Siemens is in charge of the layout and testing sections, Thomson is in charge of the logical and electric synthesis and for the user surface, and ICL is responsible for the coordination of work in the area of data storage and systems specifications.

As project leader, Siemens is coordinating all the work, including that being done by subcontractors at the University of Manchester, the University of Grenoble and Bull Research Center in Paris. The Siemens AIDA team will include over 30 development specialists who will work in the Siemens research lab in Perlach. Siemens will introduce the new developments into its "Venus" design system.

12271
CSO: 3698/595

SHORTAGE OF QUALIFIED WORKERS AT SIEMENS AUSTRIA PLANT

Vienna NEUE A-Z in German 25 Jul 86 p 8

[Article by Eva Pfister: "Siemens Looking for Qualified Labor--Chip Plant Workforce Increased by 200 to 1780"]

[Text] "2,000 workers at the Siemens-Villach components plant is an altogether conceivable number," says Walter Wolfsberger, Siemens Austria's director general. He is convinced that the almost 2 billion schillings Siemens will invest in Austria this year will lead to an increase in the size of the labor force. Now that the Villach microchip plant has overcome the drop in the computer market, the changeover to part-time work instituted last year was rescinded sooner than expected and during the past 8 weeks 200 new employees were hired.

While other businesses are asking their employees to take early retirement or are firing them; while they economize or even go bankrupt, Siemens Austria which presently has 10,500 people working for the conglomerate and 15,800 for the stock company is expanding the size of its old plants or building new ones.

On 13 October, a new telephone plant, in which 800 million schillings have been invested, will be built in the Erdberg district of Vienna. Siemens has also invested 400 million schillings in a software house [?] in the Floridsdorf district of Vienna and this fall, a plant for systems technology and software is to be built in the Nonntal district of Salzburg which will employ 150 persons.

According to Siemens Austria press relations head Peck, the problem lies not so much in the creation of jobs but in finding qualified personnel.

At the Villach plant, for example, where Siemens is investing some 700 million schillings this year to change over from computer chips to logic components, the search is on for increasingly better qualified personnel--but with little success. At the Villach microelectronics research center, which presently employs 85 researchers, Siemens is only hiring highly trained technicians.

Unemployment in Austria is on the rise but qualified labor has to be searched for like a needle in a haystack, Siemens sources say.

A firm that wants to go places--but where are the people who would climb aboard ?

SDI CAUSES STRIFE IN FRG RESEARCH CIRCLES

Frankfurt/Main FRANKFURTER RUNDSCHAU in German 10 Jul 86 p 11

[Article by Welf Schroeter: "An Armaments Manager Got University Groups to Act: 'Cooperation with the Institute only for Civilian Research'"]

[Text] Tuebingen--It was supposed to happen quickly and quietly--the establishment of an institute "of the University of Tuebingen" which would have involved the time-honored university in the American SDI plan. But only after months of dispute, the university senate at its last meeting before the end of the semester has now agreed to limit cooperation with the institute expressly to civilian research and to add the relevant passages to the cooperative agreement.

This agreement was preceded by a fundamental battle, waged with unusual intensity, over the responsibility of science. Involved in it were university groups, union representatives, professional organizations, along with federal, Land and local governments, as well as ministers, mayors, political parties, police officials, businessmen and the press. The debate started at the beginning of June of last year when university president Adolf Theis informed his senate that a new institute for the university had been established in neighboring Reutlingen. The charter had already been accepted, the members of the institute's board of governors had already been appointed by the minister of economics, the board of governors had already met the day before, and yet he asked his senators to approve this action after the fact and retroactively grant this hitherto unknown construct the designation "of the university."

He explained to the surprised auditorium crowd that the institute was a model for Baden-Wuerrtemberg and was the first example of a privately owned, non-profit organization in the form of a foundation. This "Foundation for Research in the Natural Sciences and Medicine at the University of Tuebingen in Reutlingen," he said, will receive support from the Land budget in the amount of DM 10.5 million over five years. In answer to the question of why industrialists were represented on the board of governors of the non-profit foundation while spokesmen for the German Trade Union Federation (DGB) had neither a seat nor a vote, the senators received the following surprising reply: this was a research facility for business enterprises. The call by the university group of the Education and Science Labor Union (GEW) for a solid foundation of accompanying social scientific research and assessments of

technological consequences was categorically dismissed. Since the institute was in the process of taking up its work, the university leadership was urging approval by the senate and preparation of an official cooperative agreement.

Those in the Land cabinet who initiated the project had allowed more than two years for planning the foundation. ". . . As a result of the concept developed by Dr Guenter Hoff, a member of the Land government's 1982 research commission and a former supervisor at Dornier System (sic) in Friedrichshafen, the institute will function primarily as a link between basic research and industry in the areas of materials and sensor research, biotechnology and medical technology."

Massive criticism regarding inadequate monitoring of the use of public funds in a private foundation was confirmed in an expert opinion paper prepared by the Land accounting office itself. It not only expressed considerable uncertainty about the scientific qualifications of Hoff who had in the meantime become head of the institute and its chairman of the board, but also, in addition to the criticism regarding a lack of controls, came to the drastic conclusion that, ". . . There is the impression that the institute was created above all to provide for the institute head who has left the employ of Dornier System (sic)." In addition to the university president and the minister of science, the minister of economics and technology and the lord mayor of the city of Reutlingen are also represented on the board of governors; therefore, representatives of the Green Party in the Landtag and on the Reutlingen city council have more than once criticized the undemocratic way in which the foundation was established, the disregard for scientific expert opinion papers and the misuse of public funds. In spite of the parliamentary concerns, the senate of the University of Tuebingen formed a committee to work out a cooperative agreement with Hoff's institute. Critics of the undertaking were not included.

Up to this time it was intentionally not possible for the agencies participating in the foundation to name the concrete research projects established at the institute. However, it did become clear what kind of a loose, informal "association" the foundation can be viewed as. The chairman of the board of governors is a management-level employee of the leading producer of medical instruments, "Aesculap." Together with Zeiss (Oberkochen), the optical equipment producer, "Aesculap" is represented at the "Institute for Laser Technology in Medicine at the University of Ulm" as a foundation under civil law. The two companies, together with Messerschmitt-Boelkow-Blohm, are establishing the first medical laser center at the Free University of Berlin in the form of a "non-profit" private company limited by shares.

The wording of Hoff's position with regard to the American Strategic Defense Initiative (SDI) produced surprise at the beginning of this year. As a former Dornier armaments manager and expert in the field, Hoff was invited to the hearing held by the Bundestag committee on defense policy and had favored FRG participation in SDI.

He acknowledged the scientific advances made in wartime and under the title "Technological Aspects of SDI" made the following statement: ". . . Money which is adequately available for arms programs during periods of tension

makes research work easier but is, by itself, not the decisive factor. Challenging researchers with a major task appears to be more important. It provides the motivation which is always necessary in producing great effort." The former manager expressed his philosophy on science to the Bundestag committee in the statement, "Heraclitus' view that war is the father of all things seems also to be true with regard to research and development." According to Hoff's arguments, the key technologies involved in SDI would be of fundamental importance to the civilian high technology sector, as well as for the field of medical technology, for example.

At the same time it became known that Hoff was simultaneously a member of the federal cabinet's Teltschik commission which was to prepare the way for cooperation on SDI between the FRG and the United States.

Hoff's statements to the Bundestag committee threw the larger senate of the University of Tuebingen into an uproar at the end of January. After several hours of debate, that body, in a majority vote, accepted the proposal of the university group of the Education and Science Labor Union (GEW) and recommended to the smaller senate with jurisdiction over such matters that the university immediately disengage itself completely from the foundation. The decision of the larger senate caused the controversy to flare up once again in the Landtag and in the Reutlingen city council. SPD and Green Party members of the city council came out against any involvement of the Reutlingen founders' center, of which Hoff's institute was a part, in SDI projects. SPD Bundestag representative, Herta Daeubler-Gmelin, called support for SDI a crime. The German Trade Union Federation (DGB) in Reutlingen wanted to know how Hoff could be prevented from imposing his views at the institute. As a countermove, Minister Herzog, the Baden-Wuerttemberg minister of technology, replied to the criticism of representative Ulshoefer of the Green Party in the Landtag as follows: "The Land government knows of no statements by the chairman of the board of the foundation presented at the Bundestag hearing which conflict with the foundation's charter or which infringe upon the rights of any third parties, or which therefore conflict with the right to freedom of research and education." While a CDU representative to the Landtag from Reutlingen sought to lump foundation critics together with violent terrorists, Hoff said candidly, "The smear tactics in the press by some people were so awful, so criminal; this is worse than in the Third Reich--this is a new kind of Jewish persecution."

Only after renewed debate in the Reutlingen city council and, by this time, the fourth parliamentary treatment of the subject in the Landtag, the institute's management and the minister of economics and technology, under whose jurisdiction the institute falls, declared by mutual consent that there will be no SDI research projects at the Reutlingen foundation.

For the University of Tuebingen senate the result of the months-long controversy over its possible involvement in the "Star Wars" plan was as follows: For the first time in the history of the university, scientific cooperation was knowingly and intentionally limited to civilian research and utilization. Should the privately owned foundation neverthess become partner to an agreement involving military projects (with third parties, for example), the senate is entitled to terminate and dissolve the agreement unilaterally.

With a clear majority the local scientific community also resisted the attempt to undermine further the fundamental requirement to publish the results of new research. Scientific works produced in conjunction with the institute must be published 12 months following their completion at the latest.

In this hard-fought battle, the critics had to put up with being called "poison for the university." They were even threatened with criminal investigation. The head of the DGB for Kreis Reutlingen, Walter Speidel, saw his fears confirmed in a lengthy discussion with Hoff concerning assessment of the consequences of technology, "There is the danger that in place of further socially and ecologically responsible development in terms of basic research in the natural sciences and medicine to benefit society, research will aquiesce to the one-sided interests of entrepreneurs."

On the one hand this cooperation between the University of Tuebingen and the privately-owned model foundation precludes its immediate use now for military purposes. The freedom of scientists to participate in business-oriented research involving the streamlining of operations, on the other hand, remains unchanged. However, personnel in Reutlingen companies--among others--have largely been supplied to these kinds of "non-profit" foundations without protection. As an illustration, the requirement put forth by the unions for representatives of the employees on the foundation's board of governors was dismissed with the remark that there would then no longer be adequate assurance that new development projects could be kept secret from the competition for as long as possible.

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EC COMMISSION VP NARJES ON S&T COMPETITIVENESS, EXPENDITURES

Conquer Diversity, Work United

Duesseldorf VDI NACHRICHTEN in German 11 Jul 86 p 2

[Article by Egon Schmidt: "Overcoming Divisiveness and Acting Together"]

[Text] VDI-N, Munich, 11 July 1986--The countries of Europe and in particular those belonging to the European Community will have to join together under all circumstances in science and technology, if they mean to hold their own vis-a-vis the United States and Japan. This point was stressed by Dr Karl-Heinz Narjes, the vice president of the EC Commission, at this year's meeting of the Munich IFO Institute for Economic Research. Narjes issued an urgent warning against "national egotism and political shortsightedness," since Europe will otherwise run the risk of losing "what may be an unique historical opportunity for self-assertion."

In Narjes' view, the "third industrial revolution" being brought about by rapid technological progress is having "an impact which can scarcely be assessed" and which is forcing us Europeans to find a quick answer to the rapidly changing situation. This is particularly true for innovative strategies being pursued in the United States and in Japan which are heavily marked by government subsidy programs and have "greatly altered the competitive conditions on the high technology markets."

Narjes called for "concrete steps" aimed at achieving a common research and technology policy and, in this context, presented "the new R&D skeleton program of the EC for 1987 to 1991." It is to be "funded with a median volume of 10.3 billion ECUs [European Currency Units]" which is actually a small amount as compared to the vast sums being consumed by the agricultural economy alone.

In Narjes' view, other major preconditions for Europe's ability to assert itself in the years to come include progress in the realization of the common European domestic market and the liberalization of public contracting. The latter, above all, is an "important precondition for the realization of a technology community. But the "standardization of technological norms and standards" also is of the greatest importance, he said.

In the discussion which followed the remarks by the EC official, Dr Otto Schlecht, a state secretary in the Bonn ministry for economics, voiced the opinion that "the creation of generally good investment conditions for business" was even more important than the adoption of a technology policy as an, at best, flanking measure. And with a sideswipe at Siemens, whose board member Prof Karl Heinz Beckurts was also sitting on the rostrum, Schlecht expressly called for "an opening up of the public procurement markets"--even at the expense of a handful of "purveyors to the court."

Beckurts, of course, could not sit still for such a remark , emphasizing that his firm does play a very major role in exports particularly of telecommunications products. And as far as liberalization of the procurement markets was concerned, he said, it would have to be a "genuine liberalization" and it would not do to have private business and state-owned firms compete in situations where the latter might be able to take advantage of special calculation benefits.

Heinz-Oskar Vetter, the former head of the DGB and present member of the European Parliament, pointed out in remarks which received spontaneous applause that the European Community does not have any apparatus which would enable the labor force to have a voice in important decisions. As a result, the labor union-business debate was inevitably being "moved back into the national sphere" and this, in turn, inevitably subjected the Community to divergent strains once again. "And this," said Vetter, "is the ailment from which the EC suffers."

Just how serious the present situation already is for Europe and how pronounced the worldwide abandonment of the classic, private ownership market economy already is Narjes finally made clear by citing an example which should give one pause. The United States, he said, will be spending some $500 million in the years ahead just to make sure that its national aircraft technology remains "absolutely dominant throughout the West" in the decades to come. And--however great one's love for the beautiful and exalted precepts of the free market economy may be: "Should Europe simply take this lying down ? Or should it do something about it ? And if so, what ?"

Nuclear Safety Projects Gain, Others Cut

Frankfurt/Main FRANKFURTER ALLGEMEINE ZEITUNG in German 25 Jul 86 p 5

[Article by Ho.: "Brussels Aims to Cut Research and Technology Budget"]

[Text] Brussels, 24 July--EC budget difficulties are now also having an impact on expenditures for research and modern technology. The Brussels commission is therefore forced to cut the 1987-1991 skeleton program for research and development of future-oriented technologies by some DM 2.8 billion. Commissioner Narjes, who is responsible for research and techno-

logy, announced that the commission has cut the originally projected expenditures for the new 4-year program in research and modern technology in the 12 member countries from 9 billion ECUs (or about DM 19.4 billion) to 7.7 billion ECUs (or DM 16.6 billion). But reserves amounting to 15 percent or just under DM 2.4 billion must be added to this amount. These reserves are earmarked for the projects which the Commission was forced to cut. These include plans for improving information technology in Europe and general innovation subsidy programs. In light of the Chernobyl reactor disaster, the Commission has decided to increase research expenditures for reactor safety still further.

The skeleton program unanimously approved by the Commission is in agreement with the Luxembourg council resolution which characterized research and technology policy as an important component of European unity. Just under 60 percent of the skeleton program budget is to help improve the competitive position of the European economy, particularly vis-a-vis the United States and Japan. Among other things, this includes the realization of the contemporary "information society" with the aid of computer programs and a variety of electronic technologies. The "Esprit Program" is one of the projects which is to help the Europeans achieve this goal. In the 1987-1991 budget, the Commission has set aside 80 million ECUs (or DM 172 million) for a new item, i.e. marine science. Narjes particularly emphasized the strengthening of the innovative potential in Europe. If the realization of the European domestic market by 1992 is to make any sense at all, the member nations of the community would all have to take part in it, if possible. That the Europeans need to catch up with the Americans and the Japanese in the field of high technology, no one will deny. Strengthening the innovative potential of industry is becoming increasingly important--particularly with a view to making gains in economic growth , to the job market and to economic prosperity.

Narjes took note of the fact that the expenditures for research and modern technology called for by the Commission have not yet been approved by the council of ministers. Even though the ministers were unable to agree on the budget in their latest meeting, substantial cuts in the research and modern technology budget are to be expected. It has also been learned here in Brussels that the Commission's 1987 budget proposal of some 820 million ECUs (or about DM 1.8 billion) provides for a wide variety of research projects. The finance and budget ministers wanted to cut about half of these. The Commission had proposed obligation authorizations amounting to DM 645 million for future programs but the finance ministers also cut these in half. Looking ahead to the next meeting of the council of ministers, one may expect proposals for similar cuts in the research and technology budget of the community.

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SIXTY-TWO NEW EUREKA PROJECTS APPROVED IN LONDON

Paris LE MONDE in French 2 Jul 86 pp 1, 32

[Article by Francis Cornu and Philippe Lemaitre: "The London Conference: The Europeans Reopen the Eureka Project"]

[Text] Some 40 ministers from the countries participating in the European Technical Community project Eureka, met on Monday 20 June in London. At this interministerial session, France was represented by Messrs Raimond (foreign affairs), Madelin (industry), and Devaquet (higher education and research). The London Conference brought a number of significant advances to the project as a whole.

From Our Special Correspondents

London--The 62 projects for technical cooperation presented by enterprises in the 19 countries that participate in the Eureka program (Footnote 1) (During this meeting, Iceland joined the existing 18 member nations--among which the 12 members of EEC, represented as a whole by the Brussels Commission), approved during the London Conference, represent a total investment of the order of 2 billion ECU, or about 14 billion francs; they are added to the 10 projects approved by the ministers' Hanover Conference in November 1985. "This will demonstrate Eureka's soundness," observed Mr Madelin, French minister for industry. "This conference allows me to illustrate the interest of the new government in Eureka," indicated a little earlier Mr Raimond, minister for foreign affairs. In fact, even though it is still in its launch phase, the initiative taken a little more than one year ago by Mr Mitterrand is proceeding in an apparently satisfactory manner, despite the skeptics who clamor "show me."

But the large number of projects presented at the conference testify to the interest of the enterprises, an interest which is widening: the British and especially German manufacturers, who were still holding back at Hanover, now seem to be convinced. The French participate in 40 of the new projects, the United Kingdom in about 30, and FRG in 16. The small countries, particularly

those of Benelux, who were initially reticent about an operation which they feared would be carried out at the expense of cooperation efforts pursued within the EEC, and would thus more readily consecrate the predominance of the "big boys," are now reassured and very active.

The statement issued at the conclusion of the meeting points out with satisfaction that the adopted projects "imply a collaboration that covers a broad range of advanced technologies," and that "the great majority of these projects aim to develop products, processes, or services with potential international markets." The statement also underlines "the role of small and medium-sized businesses in a number of projects." The largest number of them concern information technology (18), computer-aided production, and robotics. Their costs vary considerably: several stand at less than 10 million ECU (70 million francs), but seven exceed--significantly at times--100 million ECU (700 million francs).

Light Handed Administration

"Most of these projects receive public financing," observes the French contingent, carefully indicating that the new government has no intention of appearing less generous than the previous one. Given the stage of progress of the projects, this year's effectively granted subventions should be of the order of 350 million francs, but they will double in 1987, explains the minister for industry. Subsequently, the state's effort should reach a ceiling of about 1 billion francs per year. The partner countries, particularly the Germans and the English, emphasize the fact that public aid can only play a complementary role.

The meeting's participants repeatedly stressed the need to avoid the burden of bureaucracy in Eureka; but a minimum structure is indispensible. The observed acceleration of the program was in fact facilitated by the development of working methods in recent months, methods which were formally approved by the ministers' conference.

It was decided to create a "lightweight" secretariat of seven members, four of them from EEC countries, two from other European countries in Eureka, and the seventh designated by the European Commission; this secretariat will reside in Brussels. The French, supported by the Germans, proposed Strasbourg, but did not win. On the other hand, the first director of the secretariat will be a Frenchman, Xavier Fels, a 40-year old diplomat who since 1983 has been the international affairs adviser at the General Directorate for Telecommunications.

The project adoption procedure has also been defined. Member nations supporting projects conceived by their own enterprises, will transmit them to the secretariat. The other countries then have a 45-day deadline to ask questions, raise objections, or indicate that some of their manufacturers might want to become associated in a project. At the end of this time, a project will be considered ready to be approved. Between now and the next

ministers' meeting, which will be held in Stockholm on 16 December, the "high-level group" experts will examine the extent to which the Eureka label can be endowed with specific advantages, notably commercial ones, such as privileged access to public markets.

The British, after becoming less circumspect, are now fully convinced of Eureka's interest, and they prove it. Hosts of this conference following six months of presidency of the organization, they share the general optimism, and it is clear that the course of the program as a whole is stamped with their prudent, pragmatic, and henceforth determined approach. The consensus gradually established among the 19 partners corresponds to Mrs Thatcher's concepts, a fact which the British prime minister did not fail to point out.

After stating that in her opinion Europe suffered from an "Archimedes complex" (a certain disdain on the part of scientists for the implementation and application of their research), Mrs Thatcher declared: "The ideas by themselves do not conquer markets." The prime minister then enunciated several "golden rules": "We must leave the fundamental responsibility (for programs) to the industries, free to chose their partners"; "Eureka is not a source of financing" and "must not become a new bureaucracy," but "must help us open markets." It is true that this very "Thatcherian" definition of Eureka's objectives was clarified during the London Conference, and that its principles seemed to be definitely adopted by most of the other delegations.

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JUNE 1986 PLANS BY FRG, BELGIUM TO PARTICIPATE IN EUREKA

FRG Money for 15 Projects

Paris AFP SCIENCES in French 26 Jun 86 pp 7-9

[Article: "Bonn to Allocate 500 Million DM to 19 Eureka Projects Over Ten Year Period"]

[Text] The West German minister of Research and Technology, Mr Heinz Riesenhuber, announced 23 June, before the opening of the third minsterial Eureka conference in London 30 June, that Bonn would allocate 500 million DM (227 million dollars) between now and 1995 to 19 European joint technological projects.

The 19 projects in which West Germany is involved, four of which were decided in November 1985 at the Hanovre conference and 15 of which are to be adopted in London, represent a total expenditure of 1.6 billion DM (727 million dollars). The FRG's participation, including public funds and expenditures by German companies, will amount to 625 million DM.

According to Mr Riesenhuber, Eureka has proven to be a "promising and encouraging" initiative since its inception in Paris in April, 1985, as evidenced by the participation of 43 West German companies and 37 West German research institutes. Mr Riesenhuber, who will travel to London with the minister of Foreign Affairs, Mr Hans Dietrich Genscher, added that "The goal was to bring together across national boundaries the best available know-how of the countries and companies on projects beyond the reach of the partners' individual resources. This goal has been attained." Mr Riesenhuber assured us that the budget tightening measures recently announced by his colleague in the ministry of Finances, Mr Gerhard Stoltenberg, would not adversely affect West German public financing of Eureka, since these funds have been appropriated from existing budgets of the Ministry of Research and Technology.

The minister expressed the wish prior to the London conference that the 19 participants (the 12 members of the EEC, Austria, Switzerland, Finland, Norway, Turkey, Sweden and the EEC) establish the means by which private banks will participate in financing Eureka projects, specifically those projects able to be rapidly marketed. Mr Riesenhuber would also like to see the problem of Eureka's secretariat, which he would like to remain as "limited as possible", settled in London.

Mr Riesenhuber did not seem enthusiastic about the idea of broadening the Eureka circle, particularly in the direction of Eastern-block countries. "I see no problem with their involvement in one or two projects, such as the project to measure the atmospheric pollution of Eurotrac, but I do not in the near future see any prospect of rapidly increasing the number of countries participating in Eureka."

Mr Genscher, on the other hand, does not rule out the participation of Eastern-block countries in certain projects. In an interview in the 19 June issue of the weekly magazine "Review of Industry and Commerce", he stressed the fact that, although only market economy country projects were eligible to be presented, the governments involved in the Eureka project were in agreement that third-country companies could take part in certain cases. According to Mr Genscher, "we must avoid a technological splitting of Europe."

Mr Riesenhuber reiterated that he saw Eureka as a "civilian project." "But," the minister added, " I cannot rule out the possibility that discoveries will also have military uses, and it is difficult to imagine European countries duplicating financing of research on a technique with both civilian and military applications." The minister announced that a fourth Eureka ministerial conference would be held in Sweden.

The Nineteen Eureka Projects Involving West Germany

France is participating in 13 of the 19 projects in which the FRG is interested. This makes Paris by far Bonn's favored partner in Eureka technological cooperation, since the FRG is involved in only four projects with Great Britain and three with Italy.

The Fifteen London Projects in which the FRG Intends to Participate:

1) European Software Factory: creation of a European software factory which would centralize know-how in the area of computer programming. Expected cost: 700 million DM.

2) HDTV: High definition television. Development of a European standard for wide screen televisions. Expected cost: 180 million ecus.

3) Ionic lithography: a technique for manufacturing more reliable and less expensive very small-scale electronic components. Cost not yet calculated.

4) APEX (Advanced Project for European Information Exchange): creation of a computerized system of information exchange for joint aeronautical programs, like Airbus. Expected cost: 200 million FF.

5) DIANE (Integrated Automatic Neutron Radiography Device). Development of devices enabling the structures of large-scale industrial parts made of new materials (composites) to be inspected without damaging them. Expected cost: 100 million FF.

6) UMDC: Manufacture of a new generation of color monitors for surveillance of industrial processes. Expected cost: 1 million ecus.

7) Development of ceramic materials for use in diesel engines. Expected cost is 14 million DM.

8) Electron or laser beam aluminum alloy welding techniques for the aeronautical industry. Expected cost: 25 million DM.

9) PACA: development and manufacture of high power industrial heat pumps. Expected cost: 50 million FF.

10) Protein-Design: development of a method for analyzing proteins. Expected cost: 50 million DM.

11) Development of an anti-malarial vaccine. Cost: 60 million FF.

12) Surgical and recovery suite design for the year 2000. Cost not yet calculated.

13) EUROMAR: study of the ecological balance and pollution chain effects in the European seas. Expected cost: 350 million DM.

14) Development of a precise and automatic system for measurement of noise in transport systems. Cost not yet calculated.

15) PROMETHEUS: design of a safer, more efficient, more economical and more ecological transportation system. Expected cost: 15.4 million ecus in the first year.

The Four Projects Adopted in Hanovre:

16) COSINE: creation of an interconnected network of data exchange between European research institutes.

17) EUROLASER: development of high power lasers for industrial use.

18) EUROTRAC: European-scale study of atmospheric pollution in the troposphere.

19) Amorphous silicon: development of systems capable of directly converting solar light into electricity.

Belgium in Nine Projects

Brussels LE SOIR in French 3 July 86 p 7

[Article by S. de W.: "Belgium Likes Eureka, Invests 500 Million BF"]

[Text] Eureka, or technological Europe, is securely in orbit this time. Tensions arising from a fear of competition between the research activities of this new fold and those of the European community seem destined to fade in favor of a sort

of division of labor: it appears that the European community will coordinate European basic research while Eureka will be more like a subsidy program for concrete, marketable projects. Eureka's main characteristics are its European multinational nature and the fact that it brings together different-sized companies university or non-university research centers.

Having said this, Belgium is quite satisfied with the way operations have developed.

Eureka's emerging features correspond to its desires. The establishment of a secretariat guarantees, in principle, equal access of all to information; the fact that this secretariat is located in Brussels strengthens the city's position as a European capital and further encourages the complementary and non-competitive nature of Eureka with respect to research and development activities within the European community.

Five Hundred Million BF

Our country will therefore allocate 500 million BF to promote the participation of Belgian companies in Eureka. As might be expected from the liberal party affiliation of the minister in charge, this sum will be granted in "repayable advances" (read the "Point-Blank" featuring Guy Verhofstadt on page one).

For the time being, of the 62 projects bearing the Eureka label adopted in London Monday, nine are being done with Belgium companies. A tenth is under study for presentation at the next conference in autumn which will be held in Sweden (since this is the country that will take over the new rotating presidency).

Belgian Projects

Three of these nine projects are Belgian-led. The first involves the development of experimental techniques for noise detection in vehicles, with the Belgian company L.M.S. as main contractor (65 percent) and the participation of Porsche (FRG) and the University of Manchester's Simon engineering laboratory. This project will involve 1.5 million ecus (some 66 million BF) distributed over a four year period. The second project aims at developing a lithographic process for production of integrated circuits. The Belgian companies I.M.E.C. and U.C.B. are the main contractors (80 percent) and the British company Plasma Technology is participating. It has a budget of 4.5 million ecus, distributed over a three year period (176 million BF). The third project deals with toxic gas sensors, with the Belgian companies Engicom and I.M.E.C. as primary contractors and the Finnish company Vaisala participating.

Belgian companies are also involved in six projects under foreign leadership: A.B.S.Y (Paradi automated production system project), Solvay (chemical waste disposal project), S.D.M. (E.S.-2 project for the design of specific integrated circuits), S.D.M. again for the Moses automated office systems project, C.M.I. (Stabine industrial turbine project) and U.L.B. and Titaceram for new ceramic materials.

Interview with Belgian Official

Brussels LE SOIR in French 3 July 86 p 1

[Interview with Guy Verhofstadt, Minister of Scientific Affairs and Planning, by Saturnin Gomez, date and place not given, questions and answers in French]

[Text] [Question] What is Eureka?

[Answer] It is a mailbox fed by 19 countries whose respective states are only postmen. The real participants in Eureka are the companies and scientific institutions. The objective is to put all these people in contact with one another on advanced technology projects. These are concrete projects which are accompanied by a market study and which are expected to result in the marketing of goods and services. Of the 62 projects approved thus far, Belgium is participating in 10 of them.

[Question] What will the installation of Eureka's secretariat in our capital, which was decided upon Monday by the member countries, bring to Brussels and Belgium?

[Answer] This I will say very clearly: very few civil servants! Concretely: seven directors and a few secretaries. Eureka will not spawn a new bureaucracy. This does not make it any less important for us to house its secretariat. In the first place, it strengthens Brussels' role as a European capital. Furthermore, it will be possible to enhance the value of Eureka projects by establishing a direct link with nearby EEC data banks. Finally, Belgian companies will be in a prime position to draw from this precious source of information.

[Question] You emphasize the importance of private initiative in Eureka projects. However, states like the Federal Republic of Germany and the United Kingdom are going to intervene financially to support their companies' initiatives. Will the same be true in Belgium?

[Answer] The Val-Duchesse plan has earmarked 500 million in budget funds for this purpose, which we will distribute in the form of repayable advances to Belgian companies participating in Eureka projects. Financing will be provided at the rate of 50 percent for large companies, 80 percent for small and medium companies and 100 percent for scientific institutions such as universities.

[Question] Isn't this sort of interventionism in contradiction with the neo-liberal economic policy which you tenaciously defend?

[Answer] The situation is a temporary one intended to launch Eureka. The states which participated in the London conference last Monday agree that there should be more private financing. Formulae for the creation of a European venture capital market to finance the majority of these projects will be studied at the next ministerial conference, which will be held in Sweden in November.

[Question] Is the European Eureka project a move against the American "Star Wars"?

[Answer] It is unquestionably an affirmation of Europe in a sector in which the Japanese and Americans represent the competition. But Eureka is not directed against anyone. In the most extreme case, it is possible to imagine the involvement of an American company in a Eureka project, if this were indispensable in carrying it out.

[Question] Will the 500 million that Belgium is going to allocate to Eureka be pared from other research sectors?

[Answer] Not at all. Eureka has nothing to do with basic research. Our desire is to collaborate on concrete and short-term projects which we would not have been able to finance alone.

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CSO: 3698/606

FRG INITIATES BASIC RESEARCH PROGRAM TO PARALLEL EUREKA

West Berlin TAGESSPIEGEL in German 11 Jul 86 p 8

[dpa Report: "Basic Research Initiative"]

[Text] The government in Bonn has developed a new initiative aimed at achieving closer European collaboration in basic research and the humanities parallel to the EUREKA program whose primary focus is on marketable high technology projects. In a press interview, Anton Pfeifer (CDU), the parliamentary state secretary in the ministry for education and science, explained that the initiative is to include all the member states of the Council of Europe.

At the behest of the Bonn government, a closed-door meeting of the "Deutsche Forschungsgemeinschaft" (DFG) [German Society for Research] and the European Science Foundation (ESF), the umbrella organization of the European national science organizations, was recently held in the West German capital at which time initial proposals for closer collaboration in university and basic research were worked out. Pfeifer said in this connection that European cooperation should not be intensified in high technology alone. It is important for scientific and political reasons, he said, to include basic research as well as a wide range of subjects in the humanities. The goal will be to develop research priorities on a Europe-wide basis.

According to Pfeifer, the FRG could use the 162 special research areas of the DFG as a starting point and open them up for greater European cooperation. Before the Bonn government starts to approach the member governments of the Council of Europe, the national science organizations should discuss the proposals for cooperation with their respective governments. One of the major switching points for the coordination of large-scale joint programs will be the ESF which is headquartered in Strasbourg and headed by former DFG President Prof Eugen Sebold. To prepare for the German contribution, the medium-range budget plan of the Bonn education and science ministry for 1988 has earmarked the initial sum of DM 25 million.

Against this background, Pfeifer called for more exchanges of students and young academics across national borders. The amended BAFoeG [Federal Law for the Advancement of Education] will provide even better ways of

funding such programs in the future. For this year, he said, the ministry's budget has set aside DM 63 million (or about 50 percent more than in 1982) for this purpose. The 1987 budget will be increased still further, to DM 78 million. According to the state secretary, Bonn is making the implementation of the ERASMUS exchange program proposed by the EC Commission and scheduled to start on 1 January 1987 dependent on mutual recognition of studies completed in other countries and the waiver of tuition fees.

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CSO: 3698/590

NETHERLANDS COMPANIES, INSTITUTIONS IN NEW EUREKA PROJECTS

Rotterdam NRC HANDELSBLAD in Dutch 1 Jul 86 pp 1, 13

[Article by staff writer Eefke Smit: "Agreement on 62 EUREKA Projects Costing 5.25 Billion Guilders]

[Text] London, 1 July--The 40 European ministers who met yesterday in London to discuss the European technology program EUREKA gave their approval to 62 new technology projects costing 5.25 billion guilders.

Brussels was selected as the site of the EUREKA secretariat that is to be established.

The Netherlands will take part in 11 new projects and has joined 3 others already in existence. The Netherlands government will provide financial support in the amount of about 15 million guilders to these 14 projects. In addition, the Netherlands will provide a member of the seven-person secretariat that is to coordinate EUREKA in the future.

The EUREKA initiative, for which French President Mitterrand sought support more than a year ago from the European governments as a reply to the American SDI program, has now expanded into a technology program that 19 countries are participating in. Besides the EEC members, this includes the Scandinavian countries, Austria, Switzerland, Turkey, and also Iceland since yesterday. In the final commentary, each of the ministers emphasized that with the seven-fold increase in the number of projects Europe has gained momentum.

How much subsidy the Netherlands participants in EUREKA projects will receive when they reach the stage of actually carrying out the projects is still completely open, Minister Van Aardenne said yesterday in London. He pointed out that at that time there will no longer be a separate budget but that all participating companies will be eligible for consideration for the Ministry of Economic Affairs' regular subsidies for technological development.

For a number of the projects approved yesterday the ministers' agreement is politically significant. These are the ones involving technological developments where it is important to establish a European standard early on. That is the case, for instance, with the high definition television (HDTV) project

from Philips, Thomson, Bosch, and Thorn EMI. Because of its much better picture quality, HDTV will replace the present TV system in the future.

Uncertainty over Traffic Guidance System

Yesterday there was uncertainty about the approval of the Philips and Renault traffic guidance system named Carminat, which would use a computer built into the automobile to indicate the correct route. France would not approve the financing and in addition a similar project had just been approved, in which 12 other European car-manufacturers besides Renault are participating. This second project, which is named Prometheus, involves more than just a traffic guidance system. Prometheus is to produce a car at the start of the 1990's that is completely computer-run.

The Prometheus participants--these include Daimler Benz, Fiat, BMW, British Leyland, Volkswagen, and Volvo--are not eager to include Carminat (and thus Philips) in their own program. The car-manufacturers want to wait a year to see which electronics firms they will allow to develop the computer systems, and thus to establish standards. Renault and Philips will now develop their Carminat system separately from Prometheus.

[Box, p 13]

Netherlands EUREKA Projects Approved in London

Projects	Participants
1. Industrial laser	Philips, Holec, UCN
2. Carmat 2000 (materials for the car industry)	DSM
3. ES 2, design and production of chips	Philips
4. Chemical waste destruction laser, detection and destruction of chemical waste by means of lasers	Akzo
5. Operating room 2000	Honeywell in Best, Br.
6. Eau claire, cleaning river water	Boskalis
7. Transpolis-transpotel, industrial park with advanced telecommunications capabilities and data banks	Wilma, Philips, PTT, and Sijthoff
8. Carminat, traffic guidance system	Philips
9. Crop management systems, expert system for farmers	Vicon, Philips

10. High definition television	Philips
11. Europari, automated production of small metal parts	Fokker
12. Eurotrac, environmental measurements	various Netherlands research institutes
13. Cosine, European computer network among universities	Ministry of Education and Sciences
14. Euromar, measurements at sea	Ministry of Public Works

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CSO: 3698/571

AUSTRIAN FIRMS TO PARTICIPATE IN 5 EUREKA PROJECTS

AU261355 Vienna DIE PRESSE in German 26 Jun 86 p 9

[Special report by "CHI/HAS"]

[Excerpts] Vienna — Eureka, European joint research cooperation, has quickly become a reality. Last year the initiative was started by France and the FRG in order to establish a European counterpart to the U.S. and Japanese lead in high technology. Already in November, the member states, which include the EC and EFTA states and Turkey, agreed on the structure and organization of the research cooperation and started the first 10 projects. Next Monday, 30 June, another 100 projects are to be approved by the third ministerial conference in London. This time Austria is going to participate in five projects.

Austria is already participating in 2 of the 10 projects that have so far been approved within the framework of Eureka. One project, Eurotrac, is aimed at researching air pollution across borders. The other one, Cosine, is directed at achieving the linking of electronic data processing systems all over Europe for scientific and technical purposes.

At the forthcoming ministerial meeting in London another five projects with Austrian participation will be introduced. The Matyk company of Gumpoldskirchen is already cooperating with Spanish and Greek partners in developing a process for chrome-free and thus environmentally safe leather tanning. The Plansee metal plant near Reutte is carrying out research together with Swiss and Netherlands enterprises and research institutes for the production of supra-conducting wires and magnets; its share during this first stage amounts to about one-fifth, that is about 6 million schillings. During the following stage, in which the nationalized Elin company will probably participate, the Austrian share is estimated to rise to about 70 million schillings.

Future projects concern the development of equipment for the mass production of animal and human cell cultures, the production of fine ceramics materials with wet-chemical methods, and the application of ion projection for the manufacture of microelectronics component parts, a project in which the Vienna Technical University, the Berlin Frauenhofer Institute, and Siemens Munich are participating in addition to the Austrian IMS company (Ion Microfabrication Systems Ltd). The average period for the research projects is 3 to 5 years, the Austrian share in the expenditures amounts to 5 to 160 million schillings.

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CSO: 3698/607

ESPRIT ENDING PHASE 1, STARTING PHASE 2

Amsterdam COMPUTABLE in Dutch 2 May 86 p 2

[Article: "ESPRIT's First phase Enters the Final Round. Great Interest in Additional Possibilities for Robots"; first paragraph is COMPUTABLE introduction]

[Text] Brussels--The European Community has made a last call for proposals for forming joint ventures to handle projects in the ESPRIT program's first phase. Companies have until the end of June to apply.

From what is being said in Brussels, it is evident that at present the officials responsible for ESPRIT, the project for the stimulation of modern technologies within the European Community, are concentrating predominantly on robotics. From being a machine preprogrammed for one action or a single combination of actions, they want to transform the robot into a piece of technology which can handle tasks that are more closely related to human qualities.

B. Ross, who is supervising the last call for projects, says among other things: "If some kind of visual faculty could be given to robots, this would certainly be an enormous step forward, particularly if the computer capacity could be stepped up too." At present there are a number of projects (which the EC subsidizes up to 50 percent) which could possibly develop along these lines.

Several robotics-oriented projects have been tendered which will require more than 100 man-years. Among these there is one in which, with the aid of signal processing, measurements from several measuring points can be processed in an integrated factory computer system. The aim should be to link robotics (including those with vision systems), automatic assembly techniques, and overall computer control.

At present officials are not so interested in office automation projects, because the EC feels enough work is being done in this field. But should a well-thought-out proposal for a truly advanced project be submitted, it will nevertheless be taken into consideration.

In the field of software, the idea is to focus particularly on software for measuring the work of computer staff and computer systems, and on matters

relating to setting up and working with networks built around large, central computer systems. Development possibilities for transferable and universally usable "tools" will also be sought, particularly in those cases where they can stimulate standardization and intercommunication.

The European Community also wants to stimulate further development of microcomputer-based expert or knowledge systems. One example is research into the integration of database techniques and computer architectures in systems for numeric and symbolic processing. The EC member states have yet to comment in detail on the content of phase two of the ESPRIT project, which starts after June.

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CSO: 3698/A145

DANISH TECHNOLOGY COUNCIL RECOMMENDS 1.25 BILLION OVER 3 YEARS

Copenhagen BERLINGSKE TIDENDE in Danish 18 Jul 86 p 6

[Article by Henrik Damm; first paragraph is BERLINGSKE TIDENDE introduction]

[Text] Double the size of state subsidies for new projects in the private sector. Provide more follow-up training in private companies. Make national growth also dependent on investments in traditional areas. These were some of the Technology Council's comments on the government study, "Growth and Reorganization." Growth is not necessarily identical with high technology.

A total of 250 million kroner next year and 500 million in both 1988 and 1989. Investments of 1.25 billion in all over 3 years are absolutely essential if the Danish private business sector is to participate in the development race, the Technology Council said.

These figures appear in a comment from the council to Industrial Minister Nils Wilhjelm against the background of the government's debate outline, "Growth and Reorganization."

Funding a Political Problem

"We have not suggested where the money should come from, that is a purely political question," Technology Council office manager Anders Korsgaard told BERLINGSKE TIDENDE. However the council also said that there is a great deal of uncertainty connected with the need for subsidies over the long term. The final amount cannot be determined until an analysis is made of how the projects that have been started are going.

Interaction With the State

The Technology Council also pointed out that special education and follow-up training in private firms plays a central role.

"Only with a very effective effort by the firms themselves will it be possible to bring about the desired growth in total educational activity, but of course there must be an appropriate interaction with the public education system," the council said.

Technology Alone Not Enough

Investments in development should not be concentrated solely on the acquisition of advanced technology. The council recommended that to a large extent investments be made in more traditional areas, such as management, information processing, marketing, systems design, and so forth.

The position of the Technology Council and that of the government on the future "course" are virtually identical. But the Council did recommend that a big investment be made in biotechnology, materials technology and information technology.

At the same time positive special treatment should be given to local areas with special needs and possibilities. Finally, basic research and applied research should be strengthened, and agriculture and fishing should be included in the debate on a dynamic business policy.

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CSO: 3698/575

FRG COMMISSION RECOMMENDS TECHNOLOGY ASSESSMENT BOARD

Duesseldorf WIRTSCHAFTSWOCHE in German 4 Jul 86 pp 20-23

[Unattributed article: "Bonn to Provide Guidance"]

> [Text] A new committee of the Bonn parliament is to assess the consequences of the new technologies. That is what a Bundestag investigating committee has recommended.

The nine deputies and eight experts had a difficult time of it. On the one hand, according to the way their mission was defined, they were not to "limit the legitimate freedom of research" and the "freedom of business to initiate investment and research."

On the other hand, they had been charged with finding a solution which would strengthen "the parliament's political competency in assessing and predicting scientific-technological trends and in establishing the general conditions for these trends."

It is not surprising therefore that the initial 64-page report to be submitted by the technology assessment investigating committee to Philipp Jenninger, the president of the Bundestag, next week moves back and forth between these two positions.

As far as back as March of last year, the group had been called into being by the Bonn parliament for the purpose of "improving the information base of the German Bundestag with regard to major trends in technological development which will require political advice and decision-making in the future." In addition, the investigating committee was to come up with proposals on how the deputies could best be informed about the consequences of technology in the future in a rapid and timely fashion.

The 17 members of the parliamentary committee have now fulfilled the second part of their mission. They are calling for a new kind of body which is to act as "a parliamentary control board capable of dealing with the limited problem areas covered by individual committees in an interdisciplinary fashion based on technology assessment considerations" and of "dealing with the problem area of technological-social change on a long-range, continuing basis."

This board--and this is a new departure in the history of the Bundestag--is to be made up of deputies as well as scientists, who are not members of the parliament. So that the technology assessment comptrollers will be able to make their influence felt in the parliament the board may make recommendations to the Bundestag--but not against the majority of the deputies.

The board itself is to be assisted by a scientific staff of experts which will ultimately be composed of 15 scientists employed for an unlimited period and 15 other staff members employed for a limited period of time. The technology assessment commission estimates that it will cost about DM 10 million to operate the "scientific unit." The operating costs are to be funded out of the Bundestag president's budget.

The background for the recommendation by the fact finding commission is the realization that the parliament has "barely begun" to play its appropriate role in the face of the growing importance of science and technology. The commission report to Jenninger goes on to say that the Bundestag has "fallen behind" science, business and the executive and the information and budgetary resources available to the latter.

The parliament does exert substantial influence on technological change and, by issuing guidelines, frequently regulates the extent to which such change may in fact occur throughout society and the economy. But often enough, these decisions are not based on "political concepts characterized by rational perceptions and the discursive interpretation of the preconditions and consequences of technology."

This situation will change once the new technology assessment board (as yet unnamed) goes into operation. What the committee members do know is that they do not wish to rely on "a detailed concept or apparatus to provide for comprehensive control of technology."

What they aim to do is to provide the members of the Bonn parliament with a scientifically sound, prospective assessment of possible technological developments and the accompanying social consequences. The latter are "of such a long-term nature and so profound these days for the most part that they undo the logic of political plans which are solely dictated by election dates and specific legislative sessions." The establishment of the board as an adjunct of the German Bundestag thus is called an "opportunity management tool" by the commission report which was approved unanimously.

In all likelihood, however, the debate on the meaning and usefulness of the proposed board to the membership of the Bundestag will start in earnest once the report reaches Jenninger's desk. To be sure, CDU Deputy Josef Bugl, who chaired the fact finding committee, has tried over the past 2 weeks to create a favorable atmosphere for his plan among the deputies and has even found the otherwise extremely thrifty budget committee to be "well disposed" to it. But some deputies who feel an obligation to free

competition are still afraid that the establishment of a technology assessment board might permit investment controls to enter the Bundestag through the back door, as it were.

Heinz Riesenhuber's ministry for research and technology also has reservations about the Bugl plan. The proposed technology assessment board would create competition for the minister. The parliamentarians would no longer "be almost defenseless in the face of the hegemonial information available to the government" in the future.

Which is one reason why Bugl is urging the parliament to deal with the fact finding committee's report and to vote for the establishment of the technology assessment board during this legislative period. If the members of the parliament raise objections, then "all our work was for nothing," as one member of the Bugl committee has said.

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CSO: 3698/600

CIPI RESOLUTION APPROVES FUNDS FOR ITALIAN RESEARCH PROJECTS

[Editorial Report] Rome GAZZETTA UFFICIALE DELLA REPUBBLICA ITALIANA in Italian on July 11, 1986 publishes a resolution of the Interministerial Committee for the Coordination of Industrial Policy (CIPI) concerning the admission of project proposals to the Special Revolving Fund for Technological Innovations. The following are selected records from this document which identify the companies admitted to the fund, research projects, and the terms of financing for government sponsorship:

BMB - (ELETTRONICA INDUSTRIALE S.p.a., small firm classification. Program: Athena project -- setting up of standard systems of modular expansion multiprocessors, suitable for the verification of industrial processes characterized by the distribution of driving power through high power electric motors.
Admissibility (law no. 46/82 Article 16): resolution of the minister for industry Commerce and Crafts dated March 27, 1986.
Place of execution: Montebello Vicentino (Vicenza).
Form of financing: Credit available at the annual rate of interest provided by Article 16, law no. 46 17 February 1982.
Maximum amount: Credit available: 45 percent of allowed costs (1.580 billion lire).
Amortization: Ten years, plus a term of five years of utilization and preamortization from the date of contract.
Beginning date of the program: January 2, 1984.
Ending date of the program: December 21, 1987.

FRATELLI MAURI - S.r.l., small firm classification.
Program: experimentation and setting up of processes with highly automated machines for the production of metallic manufactured products for assembly.
Admissibility: (law no. 46/82, Article 16): Resolution of the Minister for Industry, Commerce and Crafts dated March 27, 1986.
Place of execution: Gorlate (Como).
Form of financing: Credit available at the annual rate of interest provided by Article 17, Law No. 46, February 17, 1982, contribution as per third paragraph of Article 15, Law no. 46, February 17, 1982.
Maximum amount: a) Credit available: 22.5 percent of the allowed costs (353.8 million lire); b) Contribution: to be worked out by the Ministry of Industry, Commerce and Crafts on the date of the drawing up of the contract as per third paragraph of Article 16, Law no. 46/82, on 22.5 percent of the allowed costs applying the calculation procedure as per Article 15 of the above law.
Amortization: Ten years, plus a term of 5 years of utilization and pre-amortization from date of contract.
Starting date of the program: December 15, 1985.
Ending date of the program: December 31, 1986.

IRICO S.p.a., (small firm classification)
Program: Production of a light industrial robot prototype, multipurpose and flexible, suitable for pieces manipulation with innovative control and actuation.
Admissibility: (Law no. 46/82, Article 16): Resolution of the Minister for Industry, Commerce and Crafts dated March 27, 1986.
Place of execution: Carponeto (Piacenza)
Form of financing: Credit available at the annual rate of interest provided by Article 15, Law no. 46, February 17, 1982.
Maximum amount: Credit available: 45 percent of the allowed costs (946.8 million lire).
Amortization: Ten years, plus a term of 5 years of utilization and pre-amortization from the date of contract.
Starting date of the program: October 26, 1983.
Ending date of the program: October 31, 1986.

NORDA S.p.A. (small firm classification).
Program: modular and flexible robots with polar coordinates, controlled by microprocessor programmable logic, for the automatic transfer of pieces in assembling and printing operations.

Admissibility: (Law no. 46/82, Article 16): Resolution of the Minister for Industry, Commerce and Crafts dated March 27, 1986.
Place of execution: Brescia
Form of financing: Credit available at the annual rate of interest provided by Article 15, Law no. 46, February 17, 1982.
Maximum amount: Credit available: 35 percent of the allowed costs (756 million lire).
Amortization: Ten years, plus a term of 5 years of utilization and preamortization from the date of contract.
Starting date of the program: June 1, 1984.
Ending date of the program: December 31, 1987.

RAPISARDA ANTONIO & C. S.p.A., (large firm classification).
Program: New formulations of technopolymers for the production of elastomeric pipes for special applications.
Admissibility: (Law no. 46/82, Article 16): Resolution of the Minister for Industry, Commerce and Crafts dated February 28, 1986.
Place of execution: Cernusco sul Naviglio (Milan).
Form of financing: Credit available at the annula rate of interest provided by Article 15, Law no. 46, February 17, 1982.
Maximum amount: Credit available: 45 percent of the allowed costs (2.01 billion lire).
Amortization: Ten years, plus a term of 5 years of utilization and preamortization from date of contract.
Starting date of the program: September 1, 1985.
Ending date of the program: August 31, 1988.

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AUSTRIAN TECHNOLOGY DEFICIT LEADS TO SECURITY PROBLEMS

Vienna DIE PRESSE in German 7-8 Jun 86 p 5

[Article by Wolfgang Danspeckgruber: "Technology Deficit Makes One Susceptible to East"/"Austria's Lack of Competitiveness Could Become a Security Problem"]

> [Text] It is a mistake to carry on the discussion about high technology only according to economic criteria. If smaller countries like Austria should permanently be cut off from general progress, it could have the unfortunate consequence of a unilateral dependence on the East bloc, which would buy goods of lesser quality on the basis of long-term strategic considerations. Austrian Dr Wolfgang Danspeckgruber, at present carrying out a research mandate at the Center for Science and International Affairs at Harvard University, analyzed opportunities and dangers of technological interdependence.

High technology plays a multiple role in international relations: in international competition, in cooperation with, or transfer of, technologies classified as "strategic," and in the direct security policy area of armament technology. Through the intensive intermingling of purely economic-technological dimensions with those of an armament-technological-military nature, high technology attains an increasingly strategic importance in international relations, and thus considerable influence over defense alliances and even military neutrality.

First of all, a few definitions of concepts. The security policy of a country in general means maintenance of national sovereignty, independence and "vital" values. "Vital" means advanced technologies, economic development and social prosperity, which shows a direct connection between the criteria of security and economic-technological development.

[In box]: "In our opinion, the useful effect of the socialist system of society can and must be increased." Mikhail Gorbachev, April 1986

The concept "technology" is generally understood as knowledge and expertise which contribute to invention, development, production and

further development, respectively, of products and services of economic and social value. Such specialized knowledge relates not only to direct projects and products, but also to the organization of its manufacture, distribution and use.

Research, development and production of state of the arts goods place enormous demands on the human, financial and material resources of a country. For this reason, opportunities for acquiring the latest technologies and research results as well as the most modern products from abroad for domestic industry and its continued international competitiveness are gaining lasting importance. The acquisition occurs either through technology transfer or, better, through cooperation with foreign firms and institutions in research, development, or production, or all stages put together: therefore, in the form of a transnational scientific or technological cooperation. The willingness of countries to participate in such cooperative projects is decisively increased by the rising demands on national resources. It follows that the main arguments in favor of participation in binational or multinational projects lie either in the necessity of keeping up, or catching up, in certain technology sectors (see the development history of the Airbus or Concorde passenger planes, respectively), in fighting threatening unemployment, or else in the interest of projects not feasibly developed on a solo basis, such as the most sophisticated air and space projects like European Space Agency (ESA) or armament projects, respectively (see the Tornado fighter plane and the present development of the future European fighter plane). The products of these joint projects already show a security policy relevance not to be underestimated.

However, the problem of technology transfer is often an integral component in transnational technological cooperation projects. The major problem is this: most of the research results of various sectors of applied physics, chemistry and study of materials can be used for civilian as well as military research and development, and for industrial purposes. This is also true for direct military use of civilian goods as military hardware; for example, home computers can be used as artillery computing equipment. This is not meant as negative criticism of the most encouraging Eureka development, but one must emphatically warn about too much naivete in this country. As individual sectors of international cooperation projects show, many of them have at least indirect effects on the armament industry of the participating countries (even in the case of Eureka), since nowadays the transition between civilian and military technology is in flux. There is the additional factor that governments, especially those of medium and great powers, are tempted to utilize all new scientific and technological achievements for domestic purposes as well as for maintaining or increasing the respective international power position. Thus technologies also suitable for military use are highly welcome. In addition to diplomatic and military actions, direct and indirect economic pressure is also applied in the interest of foreign policy strategy, even in peace time.

The scientific-technological dimension is an excellent tool for this in the form of technology transfer. In addition to the much-discussed security policy effects of the West-East transfer, attention is to be drawn here to the importance of technology transfer from one Western country to another (West-West). If it is controlled within the NATO member states through COCOM (Coordinating Committee for Multilateral Export Control, headquartered in Paris) as well as by the U.S. Export Administration Act, this also has consequences for non-NATO states such as the neutral countries of Finland, Austria, Sweden, and Switzerland. Our country in particular came to feel occasionally increased U.S. pressure, which led to issuing tighter Austrian export control laws. These steps by the Vienna government caused decidedly favorable reactions in Washington, and the Austrian attitude is now portrayed as an example of a friendly non-NATO member state. According to a statement by the undersecretary in the U.S. Defense Department, Dr Richard Perle, the reason for tightening COCOM regulations lies in the stronger efforts of the Eastern side to procure civilian Western high-tech products, and to use them militarily. This rigorous and extensive application of U.S. restrictions even to the transatlantic technology transfer is leading to increased criticism that this protectionist policy is being pursued not only for purely security policy reasons, but also for purely economic goals: namely, to prevent the all-too-rapid transfer of the latest U.S. findings to competing European enterprises.

Frictions caused by this, even within NATO, shed light on a curious phenomenon: namely, "strategic-technological schizophrenia." On the one hand, industrial-technological matters within a defense community could contribute decisively to strengthening the alliance structure through intensive civilian and military cooperation. But as the problem of technology transfer points up, such industrial-technological quarrels in an extreme case have the potential to significantly touch upon the political and strategic bonds of an international defense alliance. For this reason, purely defense policy and economic-industrial questions can no longer be separated today.

[In box]: "For Austria, unimpeded supply of technological goods is of central importance." Foreign Policy Report 1984

The following is a deliberately provocative analysis, which is to prove the connection between economic-technological and military strategic matters. It is generally assumed that the old European economic power, in the course of the present "industrial revolution," might increasingly fall behind vis-a-vis U.S. and Japanese competition. A lack of efficient translation of excellent research results into commercial products, and uncoordinated and parallel research efforts within the EC member states, are held responsible. As a consequence, increasing difficulties are predicted for European products on the world market vis-a-vis Japanese and U.S. competition. If these difficulties should arise for European products, would there not be the danger that European enterprises turn more to the East? And this all the more so since, on the one hand, there still exist considerable market gaps there, and on the other hand, the Kremlin

leadership would certainly favor such European ambitions, because it would give them two opportunities. First, the acquisition of important Western technology for Eastern industry, and secondly, bringing about a split between U.S. and European interests, the so-called "decoupling." According to this analysis, in a slow and creeping development, Europe could become a natural ally of the East. For the time being, however, this is still confronted by historic and cultural facts as well as the enduring payment difficulties of the Eastern states.

In the military sector, the following long-term development might bring about a decisive change for Europe: the offensive strategic nuclear arsenal of both superpowers could become "neutralized" by strategic defense systems on both sides (such as the U.S. Strategic Defense Initiative). This would lessen the effect of the U.S. nuclear umbrella over Europe and would increase the strategic importance of conventional (and therefore, Soviet) armed forces on European and Eurasian soil. A combination of the two developments, i.e., European technological competitive weakness on the one hand, and Soviet superiority of conventional armed forces on the other, would certainly have serious consequences for Europe: West European governments, in making foreign policy decisions, would not only have to take into account the reaction of a militarily superior opponent, but also massive economic and industrial interests. Europe's political latitude in decision-making and actions would be restricted thereby. Two approaches are seen from this deliberately negative hypothesis: first, possible strategic effects of an overly large economic-technological lag for Europe; secondly, a decisive measure to prevent the development outlined above lies in greater intensification of transnational technological and scientific cooperation. If it is carried out not only on intra-European, but also on a transatlantic and transpacific basis, European enterprises could profit from technologies as well as markets of U.S. and Japanese enterprises, respectively. Establishing such a cooperation network would finally also bring about the "breaking out" of the unfavorable economic-technological European position, and thus the necessary countermeasures to the above-stated hypothesis.

High technology has a number of consequences for exposed, neutral Austria. Austria comes increasingly within reach of indirect and direct pressure because of its permanent neutrality, its limited military defense capacity, limited natural and financial resources, as well as its traditionally strong economic relations with the East and Southeast. Seen under this aspect, a special spectrum of dependency crystallizes out of the almost dominantly unilateral dependence on imports of natural gas and coal, which plays an essential part in foreign trade relations with Poland and the Soviet Union in particular, and of the diametric condition of dependence in the high-tech sector.

In this, the difference in possibilities of bridging import stoppages is relevant for security policy. In the case of important raw materials and energy sources, at least a minimum of time-limited autarchy, important for security and neutrality policy, can be created by shifting either to

alternatives, or to concepts of stockpiling certain raw materials and energy sources, if effectively planned. However, the continuous international flow of technological-scientific information, essential for the technological and scientific progress of a small country like Austria, runs practically diametrically opposed to such autarctic endeavors. Especially the ever shortening life cycle of products nowadays requires continuous adaptation to ever new research results and know-how available internationally, and thus constant and intensive contact with foreign institutes and enterprises.

Both sides have already proven that they know how to make use of this form of dependence, and are not at all disinclined to apply effectively the strategic pressure of economic connections and manipulation of inter-dependencies. Just as constant U.S. pressure in spring 1985 led to tighter export control regulations, with regard to the Eastern super power one has to be aware of its typical long-term strategy.

[In box]: "With SDI I have called upon the best scientific minds to serve world peace." Ronald Reagan, 3 January 1985

On the one hand, it must be feared that a further tightening of COCOM export controls vis-a-vis the East will work as an increased incentive to procure information illegally and thus lead to intensification of the already explosive situation of European neutrals. On the other hand, Austria must be aware that a too one-sided orientation toward industrial contacts with the East, especially by nationalized industries which must play an important part in securing jobs, among other things, could bring about certain restrictions in the Federal Government's political freedom of action. Particularly when negotiating extensions for long-term economic agreements, one must always expect political conditions. It must also be taken into account that only open and constant competition with Western high-tech industries can keep local industry on an appropriately advanced level. It is entirely possible that the Soviet leadership, on the basis of long-term strategic considerations, is quite willing to accept expensive Austrian technology, although perhaps somewhat less advanced, if a strategically useful condition of dependence can thereby be created. In reverse, lower international competitiveness brings potentially greater dependence on Western technology suppliers.

Possible answers to this high technology challenge can be found in a "triple strategy of technology-oriented economic policy."This means joint and forced public and private endeavors, oriented internally and abroad. Intensive participation in transnational scientific and technological cooperations represent the internationally oriented part which, however, must never become a substitute for domestic efforts. The latter, in addition to stimulating legislative measures and appropriate activities by enterprises such as focusing on market share strategies, must also include informing the population. The interplay of both parts, i.e., participation in international cooperation paralleled by increased domestic efforts, must be seen in the conceptual context of a long-term economic strategy and security policy based on comprehensive national

political motives. Only if our industry reaches the pertinent international level can the small neutral country of Austria cope half-way with the difficulties inherent in the technology complex in international relations, and master the dilemma between total economic openness and relative neutral autarchy and independence.

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VARIED PRESS REACTIONS TO NEW EUREKA PROJECTS IN FRANCE

Future Not Assured

Paris L'USINE NOUVELLE in French 10 Jul 86 pp 24-25

[Article by Marc Chabreuil: "Eureka: Nothing to Shout About"]

[Text] With 62 new projects amounting to 13.5 billion francs, the formation of a permanent secretariat and the arrival of a 19th country (Iceland), the third Eureka conference, which was held in London on 30 June, offers all the outside signs of success. Yet the future of Eureka is far from being assured. Because, in the first place, the concerned governments are showing a very moderate enthusiasm.

Despite Maggie Thatcher's pro-European statements, Great Britain is participating in only 28 of the approved projects of technological cooperation. And what is to be made of West Germany which participates in only 15 of them? Initiator of the program, France continues to act alone: It is involved in 40 projects and is supplying practically half of the financing of all the projects approved since 1985. What would happen to Eureka if some day it ceased to play this role of leader? Today, our government is the only one to have set aside 1 billion francs in 1986 to subvention the projects in which its industrialists are participating. With the increase in proposals, 1.6 billion will be needed in 1988. But the current budget restrictions affecting all the research programs make such an increase quite improbable.

A large share of the interest shown by our enterprises is due to state financing (approximately 50 percent). Which is far from being the case with our neighbors. England and Germany took care not to commit such sums (their spending for this year would barely reach between 107 and 160 million francs). "Eureka must not become a source of financing," declare their representatives in unison. Which explains why the industrialists of these two countries are not in a rush to propose research subjects.

In a first stage, the attraction of Eureka has been its flexibility: Practically any multinational project is assured of receiving the authorities' endorsement and the paperwork is reduced to its simplest expression. Today, it is the broad approach and diversification which reign supreme. The various projects are at entirely different levels. Some pertain to basic research. Others are closer

to industrialization: For example, the Metravib-CSEM association for the development of an assembly line for the production of silicon sensors. Some competitive enterprises, especially in Germany, object to such programs. Holding that Eureka financing becomes a more or less camouflaged subvention, they demand comparable aid.

Eureka appears less and less as the European answer to the American Strategic Defense Initiative (SDI). Whereas the latter will be at the onset of a tremendous technological leap forward, Europe is too often satisfied with modernizing its existing means of production or innovating timourously. For example, it is questionable whether the future personal microcomputer for educational purpose of Thomson, Olivetti and Acorn is a suitable project for Eureka. Some doubt it. As a matter of fact, this program suffers from a lack of clearly exposed priorities. The new technologies are covered according to the industrialists' proposals. As a result, biotechnologies, oceanography, industrial robotics, measurement technology and energy appear as poor relatives. And many projects duplicate the Esprit (data processing), Race (telecommunications), Brite (industrialization) or Enram (materials) programs of the European Community.

Yves Sillard, secretary general of the Eureka interministerial committee, and the European Parliament favor the launching of large-scale "prestige" programs: space plant, convertible planes for interurban liaisons and underwater cities. For lack of such mobilizing projects, the enticing American SDI song (18 billion francs are expected in Europe between now and 1990) is growing louder and louder.

Many large-scale enterprises, such as Matra, have already appointed "SDI Messrs" who are officially "Eureka Messrs." Now, the industrialists' research resources being limited, an active participation in both programs appears difficult. The more so as the Americans have become "head hunters" and are offering European researchers more than tempting salaries and working conditions.

The situation is the same in terms of the European governments. The English's and Germans' caution is partially explained by their participation in SDI, which, furthermore, is expanding. The first contracts allocated to Great Britain pertain, among other things, to the protection against Soviet middle-range missiles.

By integrating unofficially a "European umbrella" into their "Star War" program, the Americans are imperceptibly overtaking the anti-missile missile project that France would like to "sell" to its partners. American or European, if such a "high tech" project were to come into being, it would sign the death warrant of Eureka. Or its transformation into a European defense initiative program.

French Participation in the Programs Ratified in London

French Participants	Foreign Participants	Length (years)	Cost (MF)	French Participation (MF)	Program Goals
Data Processing					
Aerospatiale	Det Norsk Veritas (N)	5	190	125	Expert system for dealing with situation forecast, analysis, detection and diagnostic (complex process navigation...)
SESA	RTL Production (L)	5	56	28	Image synthesis for TV and industry (equipment and implementation of programs)
Societe francaise de genie logiciel	CRI (DK), Nokia (SF), CIR (CH), Solemia (I)	6	743	334	Software workshops for business data processing (and its applications) and artificial intelligence
Aerospatiale	Absy (B), Aeritalia (I), Matrici (E), Brown Boveri (CH), Ikoss (FRG)	6	200	80	Artificial intelligence for a research, production and logisitcs system management
Cap Gemini Sogeti	Nixdorf (FRG)	10	2,218	890	Software engineering workshop for business, telecommunications and industrial data processing
Alsys SA	Logica (B)	2	25.8	16.9	Software workshop for ADA language (real time applications - use of available components)
TRT	Contextvision (S)	3	60	31.2	Modular image processor (very integrated machine - specific processing modules)
Electronics					
Bull	Philips (NL), B.Ae (GB), Olivetti (I)	3	536	412	European infrastructure for the study and manufacture of CMOS integrated circuits (effort on costs and delays)

French Participants	Foreign Participants	Length (years)	Cost (MF)	French Participation (MF)	Program Goals
Thomson Semi-Conducteurs	GEC (GB)	3	494	247	High-speed design and manufacturing processes for AsGa integrated circuits
"	"	2	130	65	Development of power electronic components (GTO thyristors)
"	"	5	414	207	Development of manufacturing units of integrated circuits in small series (with available resources)
Communications					
Aerospatiale	Aeritalia (I), B.Ae (GB), Casa (SP)	5	200	70	Pilot industrial data exchange system for the space industry
Bull	ICL (GB)	3	500	275	High performance multi-media system (processing of files, images, designs, voice and photos...)
CIT-Alcatel	Plessey (GB), Italtel (I)	5	1,120	373	Wideband digital switching (interconnection box)
IN informatique	Entel (SP)	6	159.6	116	Multi-media relational data base management - communication in language as if
Bonna	Zublin (FRG), Charcon Tunnels (GB), Cogefar Costruzioni Generali (I)	5	64	25.6	Collective management of thermal energies and new urban networks (fiber optics, computerized communications, data processing...)
Thomson	Philips (NL) Bosch Fernseh (FRG)	6	1,876	625	High resolution television

French Participants	Foreign Participants	Length (years)	Cost (MF)	French Participation (MF)	Program Goals
CGEE Alsthom, Telemecanique, Merlin Gerin, RTC Compelec	Foxboro (GB), Valmet (SF), Krohne (FRG), Carlo Gavazzi (I), Rosemount (GB), Nuova Magrini Galileo (I), Nuovo Pignone SPA (I), Eckardt (FRG), Effacec (P)	5	179.2	?	Local industrial networks with VLSI circuits for real time control of processes and machines
Production/Robotics					
Eurosoft	ISEL (SP), CSEA (I)	5	200	100	Flexible workshops for the manufacture of printed circuit electronic cards
Metravib	CSEM (CH)	5	92	48.7	Production line of silicon sensors for the automotive industry, production and safety
Matra, CEA	Casa (SP), CSEM (CH), Aeritalia (I)	5	700	300	Two public safety robots for urban and natural environments
Bossard Consultants	Elkron (I), EPLF (CH)	5	200	90	Surveillance robot capable of being integrated into systems (public, goods and environmental safety)
Compagnie generale des eaux	Liebherr (FRG), Simon (GB)	5	269	127	Robot-crane (load manipulator) and robot-building (scaffolding, tool-holder...)
Materials					
SEP	MAN (FRG)	5	46	23	Diesel motors using composite ceramics
Peugeot SA	ICI (GB), BASF (FRG)	5	417	252	Design of auto bodies using new materials
Pechiney	Fiat (I)	5	84	49	Pilot production of spare auto parts in metallic and ceramic composites

French Participants	Foreign Participants	Length (years)	Cost (MF)	French Participation (MF)	Program Goals
SEP	Volvo (S), Alfa Romeo (I)	5	110	70	Turbine prototype using ceramics (5 and 2 Mw for industry and the navy)
Energy					
Gaz de France	GEA (FRG)	5	58	32.8	Absorption heat pump and heat transformer (industrial and high power applications)
Stabine	Cockerill Mechanical Industries (B)	5	107.6	59	Energy production through association of a supercharged diesel motor and a gas turbine (3 to 30 Mw)
Transportation					
Cegedur Pechiney	VAW (FRG)	4	115	60	Light structures intended for transport systems (semi-finished products and new assembly technologies)
CGA	ICSA-IDS (SP), Media Print (DK)	6	960	480	Integrated traffic control and communication system (manual or automatic driving by microcomputer)
Renault	Philips (NL)	4	350	115	System for the acquisition, transmission, processing and presentation of road information
Renault	Daimler Benz (FRG) Fiat (I), British Leyland (GB)	8	1,400	350	Overall system to improve the flow and safety of road traffic
Measurement/Control					
Sodern	Dornier (FRG), Sener (SP)	5	100	52	Mobile neutron radioscopy equipment (non-destructive industrial control of large units)

French Participants	Foreign Participants	Length (years)	Cost (MF)	French Participation (MF)	Program Goals
Biotechnologies					
Institut Pateur	Behringwerke (FRG)	3	90	30	Vaccine against the blood forms of plasmodium falciparum
Bertin et Cie	Immuno AG (A) Pfeife & Langen (FRG), Sorin (I)	3	178.5	77	Animal cell cultures (production of immune products, enzymes and hormones)
Sesif	IQB (SP)	7	40	2	Products for the treatment of cardio-vascular diseases
Rhone-Poulenc Agrochimie	Insectidas Condor (SP)	5	27	3	New varieties of drought- and cold-resistant sunflowers
Fishing					
Ifremer, Alpha Marine	INI-DCN (SP), Percanova (SP)	5	220	92	Automated industrial fishing vessel - noise control system for trawls
Pollution Control					
Rhone Poulenc	Salvay (B), Akzo (NL), Montedison (I)	5	60	30	Destruction of industrial wastes and toxic substances with high powered lasers

Success Seen for Eureka

Paris LE MONDE in French 7 Jul 86 p 36

[Article by Jacqueline Mattei: "Eureka: Finally Something Concrete"]

[Text] Components, telecommunications, data processing and robotics continue to be particularly well represented in this new batch of projects. The largest programs are found in the software field (see list below). The European Software Factory--327 ECUs--and the East Project--141 million ECUs--are in fact closely related. East is already assured of the public authorities' support, whereas the European Software Factory is a brand new project.

France participates in 40 projects, Great Britain in 29, West Germany in 15. Our industrial partners are gradually beginning to take the Eureka program seriously: Is it a sign of a certain disillusion with the SDI (Strategic Defense Initiative) prospects of the United States?

The French companies will allocate close to 40 billion francs for their participation, with the government financing up to 40 percent. The scheduled subventions amount to 350 million francs for 1986. According to Minister of Industry Alain Madelin, they should double by 1987. It will be necessary to wait for the following year in order to reach the one billion francs previously mentioned. As for the English and German governments, they stressed that public aid must only play the role of a supplement. West Germany, however, promised to allocate 500 million DM (1.6 billion francs) to the projects in which its industrialists are involved and Great Britain is not excluding the possibility of financing 50 percent of certain of its industrialists' programs.

The ministers of the 18 member countries have moreover decided to admit Iceland as a 19th member, and to establish a seven-member secretariat in Brussels (four coming from the EEC, two from other European countries participating in Eureka and the last one being appointed by the Brussels Commission). For the next 3 years, the director will be Xavier Fels, a diplomat who became an international affairs adviser for DGT.

The adoption process has been defined more accurately: Countries initiating a project will submit the documents to the secretariat; the other countries will have 45 days in which to express their interest or objections. Is it necessary to go further? Between now and the next meeting in Stockholm on 16 December, the experts from the "high-level group" have been given the mission to study whether or not the Eureka label should be accompanied by advantages such as privileged access to some public markets of the member countries. Remains to be seen if such a concept is compatible with the prevalent liberalism.

Projects Adopted in Data Processing and Microelectronics

European Software Factory: European software factory; 327 million ECUs (one ECU equals 69 francs); over 8 years. The leaders are Cap-Gemini-Sogeti (France) and Nixdorf (FRG). Other participants: Norway, Spain, Sweden and perhaps Ireland.

East (Eureka Advanced Software Technology): Also development of software factories; 141 million ECUs over 6 years. With SFGL (France), CRI (Denmark), Nokia (Finland), CIR (Switzerland) and Selenia (Italy).

ES2: Production of customs integrated circuits; 94 million ECUs over 3 years. Through the creation of a joint venture whose leading stockholders will be Bull (France), Philips (Netherland), British Aerospace (Great Britain) and Olivetti (Italy).

Moses: Multi-media service; 75 million ECUs over 3 years. With Bull (France) and ISL (Great Britain).

Mentor: Expert system for security control; 30 million ECUs over 4 years. With Aerospatiale (France) and Norsk Veritas (Norway).

Asici: High-speed workshop for the production of integrated circuits with specific applications; 30 million ECUs over 5 years. With Thomson (France) and GEC (Great Britain).

Fieldbus: Architecture of local networks associated with VLSI for real time control of industrial processes; 25.6 million ECUs over 5 years. With CGEE Alsthom (France) and British, Finnish, German and Italian participants.

BDll: Development of data bases adapted to expert systems; 20 million ECUs over 5 years. With IN2 (France) and Entel (Spain).

GTO Thyristors: Gate thyristors; 20 million ECUs over 2 years. With Thomson Semiconducteur (France) and GEC (Great Britain).

Cerise: European center for image synthesis; 8.5 million ECUs over 5 years. With Sesa (France) and RTL (Luxembourg).

Modular Image Processor; 7 million ECUs over 4 years. With TRT (France) and Contextvision (Sweden).

Realistic software workshop for ADA language; 4.3 million ECUs over 2 years. With Alsys (France) and Logica (Great Britain).

6857
CSO: 3698/616

FINNISH COMPANIES TO PARTICIPATE IN SEVEN EUREKA PROJECTS

Helsinki HELSINGIN SANOMAT in Finnish 1 Jul 86 p 17

[Article by Erkki Arni: "Finland to Participate in Seven Eureka Projects"]

[Text] Finland will participate in seven projects agreed upon within Eureka, a European organization of industrial and technological cooperation. It corresponds to 10 ten percent of the total of the 68 projects agreed on so far, reported Seppo Lindblom, minister of trade and industry, in London on Monday.

He participated in Eureka's third meeting of ministers comprising 18 nations: besides Finland, the EEC-countries, Sweden, Norway, Austria, Switzerland, and Turkey, and also the EEC-Commission.

The purpose of the meeting was to agree on establishing a permanent secretariat--to be located in Brussels--and the further development of cooperation projects.

The purpose of the Eureka project, originated from the initiative of France, is to develop the cooperation of European companies, particularly in the areas of science and high-technology. In this way Europe would develop in the areas of electronics, biotechnology, communication technology and their supporting sciences and become competitive with the United States and Japan. Otherwise, there will be a possibility that these two "technological" superpowers will gradually take over the entire information technology and its markets.

At the time of the previous meeting held in Hannover at the end of last year, there were 10 Eureka projects; now there are 68. Seven of them involve Finnish companies and institutes. The state and its institutes are representated by the Ministries of Environment and Education, the Meteorological Institute and the Institute of Marine Research. The corporate world is represented by Kone, Nokia, Vaisala and Valmet.

The projects are of high quality; some examples are, among others, the control system of industrial operations (Valmet, jointly with the French, Portuguese and British), the development of computer programming design methods (Nokia, jointly with the Germans), or gas analyzing equipment (Vaisala, jointly with the Belgians).

In his address, Minister Lindblom stated, as one of Eureka's important goals, that the free entrance of the member countries on the market must be developed. Lindblom added later that Eureka's particular significance

is that it creates opportunities for Finnish companies, and particularly for companies representing the top in technology, to enter international cooperation.

In her opening speech, England's Prime Minister Margaret Thatcher pointed out the fact that there is an abundance of scientific and technological know-how in Europe. "Europe has not suffered from the lack of Nobel-prize winning scientists," she said, but referred then to the origin of the word "Eureka", i.e. Archimedes. There seems to be some kind of Archimedes-complex in Europe. In the same way as the ancient Archimedes looked down on craftsmen, Europeans seem to look down on production, and particularly marketing, Thatcher said.

She emphasized that the current European market restrictions, with their customs and other regulations, should absolutely be abolished. She warned that Eureka must not develop into a giant bureaucracy (and added: "I would have wished that my comment would have received applause." Then the international ministers and officials really woke up to clap their hands, but in a rather subdued manner.)

12956
CSO: 3698/553

AUTOMATION OF BULGARIAN POWDER METALLURGY

Sofia TRUD in Bulgarian 13 Jun 86 p 2

[Article by Dimcho Khitov: "Automation in Powder Metallurgy As Well"]

[Text] Industry in Pleven is well known for the strategic technologies of Bulgarian machinebuilding developed and applied here: backpressure casting, powder metallurgy, and hydroplastic metalworking. The topic today is powder metallurgy, a waste-free technology conceived and developed at the Pleven Institute of Forging and Pressing Machines.

For years in succession the specialists of the institute, in cooperation with the N. Vaptsarov Plant, have been mapping out the course of development of these automatic machines, which are new in Bulgaria. The first person to work in this modern field of metal ceramics was engineer Nikola Yanchev of the institute (at the time a research and development base). With the support of his colleague, engineer Veselin Nestorov, he founded a youth brigade which assumed the risk of creating a family of machines for production of structural elements of powdered metal. After persistent investigation and a number of experiments, the team headed by N. Yanchev modified and automated a universal hydraulic press to convert it to a small automatic press for production of powdered metal parts with a molding pressure of 5 tons. This machine, a weak one by current standards, gave birth to an entire family of automatic presses exerting molding forces of 10, 25, 160, and 400 tons. Bulgaria specializes in production of this type within the framework of CEMA. A number of automatic presses for composite structural elements have been delivered to powder metallurgy plants in Svoge, Yambol, Sofia, and Plovdiv, and even abroad, to the USSR, Romania, and Czechoslovakia.

Engineer N. Yanchev, now program director for automatic press development at the institute, says that "there is no comparison with the conventional production method. The new technology ensures waste-free production in use of powdered metal raw materials and manufacture of articles. Elements of much more complex configuration can be made. The productivity is also beyond comparison. For example, a gear wheel takes 2 hours to make by the conventional method using a lathe, milling cutter, and other machines; it takes the automatic press 10 to 15 seconds. The press operator services several machines. The production cost of parts made from powdered metal is low, and the machining is accurate, dependable, and of high quality."

Although the Pleven machinebuilding industry has now made hundreds of machines of this type, the pace still lags behind worldwide development. In the developed countries, the production of composite structural parts by this method exceeds 50 percent of the volume of parts made, especially in automotive manufacturing. This is not an insignificant matter in Bulgaria. The trend in the immediate future will be toward increase in the production of powdered metal parts. This was the decision made at the February plenum of the BKP [Bulgarian Communist Party] Central Committee, and this is the program of the Pleven Integrated Enterprise for Forging and Pressing Machines and Power Engineering Equipment. This program is already being carried out. As early as 1985, the program team developed the first flexible automated production system (GAPS) for powdered metal parts followed by hydroplastic working (the project was awarded a gold medal at the Plovdiv Fair).

"Since the congress," states the chief director of the integrated enterprise, "effort has been directed toward rapid modernization of products. The most recent systems for production of powdered metal parts involve microprocessor control. The reliability and quality of the automatic presses are being upgraded. We are also investigating incorporation of individual modules of this equipment into automated production lines, complexes, and GAPS."

Experiments for modernization of an automatic press for powdered metal parts with a molding force of 160 tons are being successfully carried out in one of the departments of the Nikola Vaptsarov Machinebuilding Plant (a division of the integrated enterprise). The head of the program team, Luna Balkanska, says that this automatic press is a model for powder metallurgy and incorporates state-of-the-art achievements. The newest and most modern item is a replaceable molding unit. Made in three versions, it can easily be removed with the tool centering machine. The period of 3 to 4 hours previously wasted is now saved for production. In addition, the weight and quality of the articles produced are checked by automatic scales. Similar innovations will be applied to modernize all earlier generations of machines for powdered metal parts.

At the same time, work is in progress on development of an automatic press with a molding force of 800 tons, and there are prospects for doubling and tripling this force in the not too distant future. This will allow adoption of the new technologies for so-called isostatic (volumetric) molding. The goal is to produce articles with higher mechanical properties, as well as synthetic diamonds from graphite, powdered ceramic blanks, etc. This generation of automatic machines will also be used in ferromagnetic production, electromagnetic applications, etc.

Searching scientific and technical thought, experience, and potential are available at the institute and the plants of the Integrated Enterprise for Forging and Pressing Machines and Power Engineering Equipment in Pleven. It is now necessary to mobilize all reserves in order to pursue a course consistently toward higher accomplishments in this modern and efficient technology.

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POLAND'S ROLE IN ANTARCTIC EXPLORATION DISCUSSED

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[Interview with Prof Dr Stanislaw Rakusa-Suszczewski, head of the Dept of Polar Research, Ecology Institute, Polish Academy of Sciences, by Irena Fober: "Icy Industry"]

[Text] After a long time we are returning to the issues of Poland's research in the Antarctic.

Prof Rakusa-Suszczewski is holder of the prize of the scientific secretary of the Polish Academy of Sciences for "research on marine and land polar regions as the basis for rational use of resources and environmental protection."

From 1975 to 1976 he headed the first Polish antarctic expedition on the ships "Siedlecki" and "Tazar." In 1976-1977 he set up the H. Arctowski Station in the Antarctic.

[Question]: In December, 1975 the first Polish expedition to the Antarctic began. Today, 10 years later, can we say that it was worth it to go so far?

[Answer]: We have gained many benefits from the Antarctic. We are taking part in the international Biomass program. Two international biological experiments, Fibex and Sibex, planned for 1976-1986, were the greatest program of biological oceanic research in the world, and these experiments were accomplished. The first had 11 ships from 11 countries participating at the same time, and the second one, more than 20. The most important scientific result of this enterprise was the examination of production fluctuations in the Southern Antarctic Icecap. We were mainly interested in krill, not only as the symbol of living resources in pelagic regions, but also as a key organism upon which the functioning of the entire Antarctic ecosystem is based. Penguins, seals, whales, cephalopods, and birds feed on krill. For this reason, the determination of its biomass and fluctuation

has far-reaching consequences, economic as well as scientific. Because of this, we can send the right number of ships to the fishing grounds in a year.

[Question]: Are we recognized by the international Antarctic research community?

[Answer]: That is a difficult question, but I think that the results of biological, geophysical, and stationary oceanic research puts us in the forefront of the 16 antarctic countries, somewhere in fourth or fifth place, after the United States, USSR, and Great Britain, on a par with the FRG and Australia. The expenditures we incur for polar research are relatively minor, but Poland's participation in the Antarctic Pact, the SCAR Scientific Committee on Antarctic Research, conventions, specialized commissions and committees, and finally access to international programs gives us definite scientific benefits.

[Question]: In the 20th Century the Antarctic has been divided up among Argentina, Australia, Chile, Norway, and New Zealand. It is true that the Antarctic Pact signed in 1959 froze all territorial claims to the year 1991, but at that time nobody realized the enormous mineral wealth in the area. Do these countries not now find the pact simply inconvenient?

[Answer]: We should not be pessimistic. Of course, one can dream up far-reaching possibilities, but there is no reason for this. Following the last meeting of the Antarctic Pact, the 13th in Brussels, I can tell you that the countries in the pact -- there are 18 of them, and 16 have observer status -- think that it is the only reasonable organization that assures them the possibility of free scientific research and rational use of resources. There are even tendencies to introduce more formalization into the pact. For example there is more and more talk about creating a pact secretariat, sort of along the lines of the U.N. I am decidedly an optimist, and I think that the pact will continue to operate. There should also be more members from among the socialist countries in it, because up until now there have been only two, the USSR and Poland, but Cuba, Czechoslovakia, and the GDR have been showing interest in joining.

[Question]: On the other hand, the Antarctic has not always been an example of ideal cooperation.

[Answer]: Of course not. Right after World War II things came to armed conflict between Great Britain and Argentina. Both countries, as well as Chile, laid claim to large areas in the Antarctic. As a result many military posts were set up which were later transformed into research stations, and in 1957 cooperation began under the auspices of the International Geophysical Year. Since then this region has really been a model of peaceful cooperation, but outside the region covered by the pact we have seen examples where there is a disparity of interests. Take the Falklands, for example.

[Question]: But can this harmony last long?

[Answer]: I think that it will last so long as it is maintained by the two great powers, the Soviet Union and the United States, which are guarantors of the pact, but certain countries are trying to undermine the pact's interests. There are Third World countries that think that the Antarctic should be the heritage of all mankind. Of course the pact holds this assumption. Any country can be a member, provided that it makes its contribution to scientific research and shows interest in the area. Then it can share in the decision-making about its fate. This is just the way Poland has proceeded, and I want to emphasize most forcefully that we are meeting all the conditions of the pact.

[Question]: But let us get back to the Antarctic's mineral wealth.

[Answer]: We are by no means completely sure whether there really is crude oil there. There is just a very great probability, confirmed by the research results of the two Polish Academy of Science geophysical expeditions. Ecologists realize that the technology we have for extracting it is imperfect and that to undertake exploitation of it means putting the ecosystem to some risk. For this reason explorations to find crude oil are permitted, but it must not be extracted, nor can research be undertaken which could disturb the natural environment. Groups of the best scientists from the richest countries in the world are working on a convention for the protection of mineral resources, and I think that despite the many difficulties the principles of this convention will be established according to the best intentions to keep the Antarctic pure and inviolate, but we must not be naive. Just as we need fish, cephalopods, krill, and other products, so too the world needs new energy sources.

[Question]: How are we going to split them up?

[Answer]: That is a good question. The signatories to the mineral convention will determine the principles.

[Question]: Will there be some who are first among equals?

[Answer]: I hope not. It is safe to assume that the benefits or profits will be in proportion to the research input, but I would be careful. We have enough problems in the Baltic for us to undertake exploitation of Antarctic mineral resources. We have enough unexplored areas within Poland to think about extracting coal in the Antarctic. We are conducting research on the principle of Poland's contribution as a cultural country in the middle of Europe, with 5 years of experience in antarctic research being contributed to the world pool of knowledge.

It is not mineral resources but live resources that interest us and are of use to us. The proportion between the two must be set realistically. We must realize what we can afford, what we can manage, what we are able to do. The year after the first krill expedition, several dozen Polish ships fished in the region of the Atlantic Ocean. You must surely recall such names as kergulena, szczekacz, and klykacz. They are antarctic fish that

appeared on the market at the end of the 1970's. The Siedlecki's and Tazar's entry into that region was a great success in fishing. Please recall that in 1981, when we were chased out of practically all of the world's fishing grounds, the whole Polish fleet focused its attention right on the Antarctic region. It turned out, therefore, that the investigations that had previously been made by the Polish Academy of Sciences and the Marine Fisheries Institute provided information as to which fishing grounds we could send ships to in this extremely difficult situation. Although today most of our fleet has come back north, we are still fishing there, especially for squid. These are economic successes about which, as a biologist, I am not well informed, but I think that this is a very important argument in support of continuing the research in the Antarctic.

[Answer]: And we can fish there quite freely, because this is the last region of free fishing not under ownership?

[Answer]: Half of the statement is true. Disturbed by the over-fishing, the countries which have signed the pact -- often there have been more than 100 ships in the fishing grounds -- have undertaken intensive efforts to draft an international convention to protect the live resources of the Antarctic. Poland, which has participated in the creation of the convention since the very beginning, is one of the signatories. The convention involves certain obligations. We are not allowed to fish much at all, because the area has been "over-fished," and as a result at the moment there is practically no fish at all in the fishing grounds we are familiar with in the Antarctic. Today, after 10 years of research, we already know that the fish increase very slowly there and that it is very difficult to build the level back up, so we must be extremely careful in exploiting these resources. One of the tasks of the program that the Polish Academy of Sciences intends to implement within the framework of polar research in the coming five-year period will be an attempt to fish farm antarctic species. For the moment the scale is not very great, but this may be a way to build the levels back up. Of course one can fish out the very last one and then have none the next year, but that is what science is for, to indicate how to practice rational management of resources, and our great success has been that we are already manage to do this.

[Question]: Despite this, there have been proposals to turn the Antarctic into a great nature reserve.

[Answer]: This is the desire of the countries which have laid claim to territory in the Antarctic. I should like to emphasize that the countries that created the pact have stressed the need for complete freedom of scientific research. The USSR and Poland have also taken this position at the Brussels meetings, because we feel that any sort of rigid principles of the type associated with national parks would also limit the freedom of investigation, which conflicts with the content of the pact.

[Question]: But has there been any controversy in our country over conducting research in the Antarctic?

[Answer]: Anything that costs money is controversial. They all will employ people doing something new, something interesting, breaking down habitual, cultural, and financial barriers, but I do not have to reason in such categories or worry about whether I have employees, inasmuch as my arguments have convinced wise people, and the government has recognized these questions to be worth having scientists take them up.

[Question]: Thank you for the interview.

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